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43. 1605.

43. 1605.

43. 1605.

NEW
STAR TABLES,

ADAPTED TO PRACTICAL PURPOSES FOR TWENTY-TWO YEARS,
COMMENCING JANUARY 1843,

FOR THE USE OF MARINERS,

AMATEUR ASTRONOMERS, CHRONOMETER MAKERS, &c.:

WITH AN

APPENDIX;

WHICH, TOGETHER, CONTAIN ALL THE PRINCIPAL PROBLEMS FOR DETERMINING

THE LATITUDE AND LONGITUDE AT SEA,

WITH SEVERAL

TABLES AND EXEMPLIFICATIONS,

TO RENDER THEM OF DAILY AND PROSPECTIVE UTILITY.

BY

THOMAS LYNN,

LATE COMMANDER IN THE NAVAL SERVICE OF THE EAST INDIA COMPANY,
AND
EXAMINER
(APPOINTED BY THE HON. COURT OF DIRECTORS)
OF THE OFFICERS IN THAT SERVICE;
AUTHOR OF "THE IMPROVED SYSTEM OF TELEGRAPHIC COMMUNICATION," ORIGINAL "STAR TABLES,"
"NAUTICAL AND ASTRONOMICAL TABLES," "HORARY TABLES," "AZIMUTH TABLES,"
"MOON'S PLACE," 1827-8, "PRACTICAL METHODS FOR FINDING THE LATITUDE
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TO

JOHN COTTON, Esq., Chairman,

JOHN SHEPHERD, Esq., Deputy-Chairman,

AND

THE HONOURABLE THE COURT OF DIRECTORS OF THE

UNITED EAST INDIA COMPANY,

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SIR H. WILLOCK, K.L.S.

THIS WORK,

AS AN ADDITIONAL TRIBUTE OF GRATITUDE AND RESPECT,

IS INSCRIBED,

BY THEIR MUCH OBLIGED AND MOST OBEDIENT,

HUMBLE SERVANT,

THOMAS LYNN.

Dover, June 16, 1843.

ERRATA.

Page
xviii. Table Z, under 4^h, and opposite 70°, *for* 9′·2 *read* 2′·9
xxiii. Article 59, fourth line, *for* − or +, if + or −, *read* − or +. If + or −
xliii. Article 152, line 9, *for* 40°. 30′ *read* 49°. 30′, in part of the impression only.
1 Table A, Star No. 21, *for* head *read* heart,
10 Table B, 35th Star, March 1, *for* 18. 26. 50 *read* 18. 26. 58
15 „ 5th Star, April 5, — 0. 35. 16 — 0. 36. 16
23 „ 11th Star, May 31, — 0. 28. 47 — 0. 28. 48
23 „ 12th Star, June 1, — 3. 26. 44 — 0. 26. 44
36 „ 2nd Star, Aug. 28, — 10. 35. 48 — 13. 35. 48
39 „ 7th Star, Sept. 21, — 14. 17. 21 — 14. 7. 21

Table C, in pp. 7, 11, 13, 17, and 23, the letters H. M. were inadvertently put over the minutes and seconds, and the letters M and S over the hours and minutes; they have since been erased, and pricked in generally; should any, however, have escaped correction, the middle quantities are minutes and seconds; and the right-hand quantities are hours and minutes of time, being equivalents to the longitude in the left-hand column.

54 Table D. Polaris, Aug. 25, *for* 11. 45. 40 *read* 14. 45. 40
57 Table F. under 1858, for 17th Star, *for* 1. 30 *read* 1. 31
57 „ left-hand margin, *for* 2nd 24 *read* 25
58 „ under 1854, for 13th Star, *for* 2. 10 *read* 2. 19
78 Table N. 1st line, middle column, Star 11, *for* 14° *read* 41°
79 „ Star 18 on Meridian, Star 29, *for* E. by ¾ N. *read* E. by N. ¾ N.

In the Index, p. 31, the two first cols. should read as follows:—

line 33, Log. . . .	and half minute glass
34, Logarithm	To reduce the log., &c.

INTRODUCTION.

Under the distinguished patronage of the Honourable the Court of Directors of the East India Company, and of the Elder Brethren of the Corporation of the Trinity House, the author of this volume, amongst various and extensive works, for the use of mariners, in the years 1820—1, prepared and published his original "Star Tables" for the years 1822—3 respectively. And in his "Nautical and Astronomical Tables," those for the year 1824 were included; with "Annual Quantities," to adapt them to practical uses for future years.

The gratifying fact, that Stellar Observations have since become much more frequent at Sea, has been a material inducement to the author to endeavour to improve upon his former labours; and to bring the Stars still more into use: with a view to the security, and consequent comfort, of the Navigator.

There are few, if any, experienced Seamen, that have not suffered great disappointment, from the want of solar observations; particularly when approaching land or danger; from the frequency of cloudy weather, sometimes for days together; whilst, on the contrary, the intervening nights were as clear.—These cases prevail most in high latitudes, in the winter season; particularly in the British Channel and its vicinity: where probably more disasters occur from Shipwreck than in any space of equal extent on the navigable portion of the globe. Many of these are attributable to Atmospherical impediments, preventing the usual observations for determining the situation of the Ship in the day time; and hence the great utility of being enabled to effect so desirable an object by the Stars. The following instance, amongst many others which the writer experienced, will strongly prove the advantage to be derived from Stellar Observations.

In the year 1818, when Senior Officer, and in command, of the Honourable Company's Ship Barkworth, having the Sovereign and Providence in charge,—after an eastern route, upon reaching the

Formosa passage, we encountered a strong northerly gale with cloudy weather, which precluded a sight of the Sun for two or three days; by which time we were driven so far to the southward, as to cause great apprehension that we were approaching the PRATAS; an extensive and dangerous shoal, even with the water's edge, and well known to China Navigators. Upon the evening of the third day, the signal was made for the other Ships to show their estimated positions; which being done, they were both found so discordant with each other, and also with our own estimation, as to increase, rather than lessen, our embarrassment.

Providentially, however, and some time after dark, a break in the clouds (to the northward) gave hopes that we might snatch an Altitude of the North Pole Star. This was happily effected, and corroborated by a second observation; whereby we obtained our Latitude, which at once relieved our anxiety; and soon after, by means of the same break in the clouds, we got an Altitude of another Star for the Time, and consequently the Longitude by Chronometer, when the signal was made to our consorts to wear: and the wind soon after favouring us, we made the Lema Islands accurately the following evening, without any other opportunity of astronomical assistance.

Had not these Stellar Observations been obtained, the uncertainty of our position must have created considerable anxiety through the night, which as before observed, was hereby entirely relieved, and the subsequent course of the squadron confidently adopted.

Were other cases required to urge the mariner to the constant practice of observing the Stars, we need but to refer him to the daily papers; where a lamentable list of fatal accidents is recorded, *many of which* might have been prevented by taking advantage of similar opportunities, particularly in those parts of the navigable world that are most subject to currents,—such as off the Cape of Good Hope—(where the writer has been *set** to windward, from 60 to 100 miles of longitude in 24 hours), in the Eastern Archipelago, and amongst the West Indian Islands, &c., where the atmosphere is generally favourable for such indispensable observations through the night, but always best in the *twilight*—when the place of the Ship may be as accurately obtained by the Stars, as by the Sun at noon day.

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* Sea term for influenced or affected.

As an experienced navigator himself, the author cannot too strenuously impress the idea of the assistance and comfort such opportunities afford. He has repeatedly derived the utmost benefit from Stellar Observations—often entering a strait or passage at night, where it would have been the height of imprudence to have done so without such assistance.

Every commander of a ship would do incalculable good by encouraging the young officers in the practice of taking Altitudes of the Stars in the twilight in fair weather. This practice would make them expert in doing so when the weather was less favourable; and when it might be essentially necessary to the safety of the Ship to take advantage of the means already described.—The author was in the habit of inciting the younkers, his ship-mates, to vie with each other who should be first to point out a star in a fine evening; and then to "*bring it down*,"* which was repeatedly done whilst the horizon was clearly defined, and the Altitude read off the arc of the instrument, without artificial light: thus oftentimes getting both Latitude and Longitude.

The object of the author in offering this new edition of his Star Tables, *is mainly to assist the mariner:* but it will be found useful to Amateurs, Chronometer-makers, and all persons who are desirous of regulating their Clocks, Time-keepers, &c., by a very simple process.

Table A is a Catalogue of Stars selected for this work; each Star having a number prefixed to it, as a means of more ready reference; together with its situation, right-ascension, declination, and annual variations.

In Table B, the culmination of each Star is set down in MEAN TIME, such as all public or private Clocks on shore should show at that instant (in 1844) on the meridian of Greenwich. At the same opening of the book, the correction for any other meridian is given in Table C; and the annual correction is taken out at sight, from Table F, for any year to 1864 inclusive. So that any one having a transit instrument in the meridian, or as otherwise directed hereafter, may be enabled by any of these Stars to test his Clock, by observing the time of the culmination, and comparing it with the time shown by the Clock.

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* *i. e.* The reflected image of the Star.

A more simple, practical method is given in pp. 60 and 61, which can be effected either with or without a telescope—for which purpose, further examples are given in the explanations. The discordance that is more or less manifested in the time shown by different Clocks in large towns, would easily be remedied by this process: and however unimportant such accommodation may appear, it would doubtless tend much to favour punctuality in the appointments of merchants, and indeed in every class of society.

It may be observed that the words "Clock fast," "Clock slow," in the common Almanacs, are not generally understood. The specified quantity does not infer that the clock is *wrong* so many minutes and seconds, but that it should differ so much from the Sun, as shown by a well-regulated Dial at the place where the Clock is; and if the difference be not equal to the almanac difference,* the error of the Clock will be equal to the second difference.

Table B, by simply referring to the column under the required day of the month, shows *when* to look out for the meridional Altitudes of the Stars (numbered in Catalogue Table A), in order to observe the Latitude. This convenience will hold good during the present century.

This work affords the shortest method of finding the time at sea by the observed Altitude of one or more Stars, independently of the *right ascension* of either the Sun or the Stars,—of the *sidereal time at mean noon*, or of the *equation of time*, which are all, more or less, made use of by other writers in former methods.—The computer has here only to find the hour-angle, and by one simple quantity (taken from Table H) to reduce it to Mean Time—the difference between which and the culmination, is the Mean Time of the Ship, and hence the Longitude by Chronometer.

It gives the same facility in computing the Altitudes of Stars: and on this account, the horary angles are omitted in this volume.

D and E are Pole Star Tables; given to find the Latitude by its Altitude, at any time it may be observable.

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* This difference is the Equation of Time, and is set down at the head of each column in Table B, for each noon of the corresponding day, and also in pp. 18 and 19 of the Appendix.

D shows the culminations of *Polaris* for every day of the year 1844, and the annual corrections will be found at the bottom of Table F.

E contains the resolutions of *right-angle* triangles, having for their *data* the polar distance and hour-angle of the Star.

The numbers in the area of the Table being the corrections to be applied to the true Altitude of the Star, according to the hour-angle with which they correspond, as exemplified in articles 28 to 35.

Table F contains *simple* Annual Corrections from the beginning of the year 1843 to 1864 inclusive. They are deduced from the average of twenty years' change of the culminations of each of the 44 Stars, which have been separately computed. And (*setting aside Nutation and Aberration,* which are never made use of at Sea) they will seldom differ in the assigned period more than *four Seconds,* in the extreme, from the most rigid calculations: but will three times out of four be within two seconds of the truth, and therefore sufficiently accurate for every Nautical purpose.

Table G exhibits the Accelerations of the Stars upon Mean Time, from one day, or rather from one revolution of the earth to 385* revolutions; whereby a fixed Star being observed either on the meridian or within certain limits from that circle *on shore,* will show the error of a Chronometer, Clock, &c., in any interval, far more correctly than the usual method—namely, by the Altitude of the Sun observed in the artificial horizon.

Table H exhibits the reduction for *every minute* from one minute to twenty-four hours, for the conversion of Sidereal into Mean Time, and the contrary. By this Table, the hour-angle of any fixed Star (derived from an observation of its Altitude) is reduced by *one* simple quantity, the difference or sum of such reduced hour-angle, and the time of the Star's culmination, gives the Mean Time at the Ship or place of observation.

Tables I and K exhibit the Meridional Altitudes of the 44 Stars from the Equator to 60° North and 60° South Latitude.—By comparing an observed (true) meridional Altitude with the quantities in these Tables, the Latitude will be seen at once by their difference. The rough Latitude of the Ship will, with the help of these Tables, and the time from Table B, afford a certain method of finding the proper Star *as it approaches the meridian.*

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* They were extended thus far to fill the last column in the Table.

Table L exhibits approximately, the *earliest* APPARENT Time in the evening twilight; when the Stars of the second magnitude become visible, and when those of the first magnitude may be *brought down,** and their altitudes observed, and read off the instrument by the twilight.

The hours and minutes in this Table being subtracted from 24 hours, will show the latest Astronomical morning time they can be observed at Sea; or if subtracted from 12 hours, will show the morning hour and minute, as by civil reckoning; though it will not be so, by the difference of the equation of time.

Table M shows the approximate situation of the 44 Stars (used in this work) in the evening and morning twilight throughout the year; adapted to the Latitude 49° 30′ N., corresponding to the parallel of the British Channel; the bearings being MAGNETIC, allowing 2¼ points westerly variation; and the hours and minutes are those of MEAN TIME when the Tabular Altitudes obtain approximately. This Table will be found convenient both in approaching the Channel from the westward; and also *in* the Channel when out of sight of land.

It will also be found useful in the Downs or elsewhere to outward-bound Ships, for the purpose of finding the proper Stars to test the rate and correctness of their Chronometers, by observing their altitudes in the twilight. A Chronometer that is properly set and rated, may often prove of the utmost use in the Channel and many other situations; particularly when the Navigator, having correct charts, is unacquainted with the land he may be in sight of. The writer has often, in passing up or down Channel, successfully practised this method, by Altitudes of the Stars, even when a pilot has been on board; and has in that case, more than once, proved its usefulness.

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* See Note, p. vii.

Table N.—This Table, of similar import, shows the situations of the Stars, when others (that are signified) are on the meridian in the parallel of 49° 30′ North. The bearings in this Table are approximate *true* bearings, in which they differ from the preceding Table, to make them answer to the whole parallel. The Altitudes are only given to the nearest degree; so that the observer has but to consult this Table and Table B, to know what Star is coming to the meridian, and he will be able to find a convenient one to obtain his time and Longitude by Chronometer.

Tables O and P.—These Tables differ only in their parallel of Latitude, from Table N. O, for the Bay of Bengal, China Seas, &c.; and P for the Mediterranean Sea, Cape St. Vincent, Chesapeake, &c.

Tables Q and R.—These are derived from the Tables of the late Dr. John Brinkley, Bishop of Clogher, and Professor of Astronomy in the University of Dublin, and published by him in the Nautical Almanac of 1825.

Tables S and T.—These Tables show the days in a Leap Year, and in a Common Year also; for the convenience of finding the interval of days between the observations of Stars observed, as exemplified in pp. 60 and 61, and for other purposes.

To render the work more worthy of the mariner's patronage, an Appendix is added, containing Lyon's Tables and Rules for clearing the observed Distance of the Moon from the Sun, Star, or Planet, requiring only four places or figures in the logarithms.—Tables of the Equation of Time—Sun's Declination—The Declination of Venus—a General Traverse Table—Tables for the Correction of Altitudes, including that for the Moon's meridional Altitude for the purpose of finding the Latitude, with rules for their respective uses, &c. So that there is scarcely a problem in practical Navigation which will not be found in this work.

It is hoped that the system of numbering the paragraphs, and giving an appropriate Index, will prevent any difficulty that might otherwise arise with regard to reference.

As every attention has been paid to make this work what it professes to be, it is hoped that there are no errors that the *Errata* does not include; which are but few, and will take the purchaser but a quarter of an hour to correct.

In reference to his former publications, and in comparison with the works of subsequent writers, the Author may observe, that all have enlarged more or less upon Stellar Observations; but none have given to mariners that *practical* facility that will be found in this manual, and which from the economical way merchant Ships are now appointed, they more than ever require. As touching his more voluminous Tables, he is pleased to see that they might have been advantageously used in the construction of several Tables since published; amongst others, the most conspicuous is one entitled, by one writer, "Logarithms of the Apparent Time, or Horary Angle," and by a more recent writer, a Table of "*Log. sine square:*" both these Tables might be made by subtracting the Logarithm 5,301030 from the numbers in his Table III.* "*Rising,*" "Nautical and Astronomical Tables," or by adding (its *arithmetical complement*) 4,698970 to the Logs. "Rising," which will be found much easier than to "Take the log. sine of half the arc and double it;" or when it is required to convert a "Log. sine square" into a Log. "Rising," it may be done by a contrary process. Again, in his "Azimuth" and "Horary Tables" the position of a Star or other celestial body may be found at any time, and consequently its "Hour-Angle and Altitude upon the Prime Vertical," by simple reference to the pages that contain the necessary *data*.

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* This is a Table of logarithmic versed sines ("Rising") which was extended (to 69 pages, containing 35,640 logarithms) by the Author, at great labour and expense, to every second of the first nine hours; and for every ten seconds of the remaining three hours, where the intermediate logarithms may be had by simple decimal differences: which could not be done in the first part of the table but by interpolation, for which purpose it was necessary, in halving the Log. Sines, to adopt Dr. Maskelyne's method, as given in the Preface of "Taylor's Logarithms," to find them; there being no Table then extant of logarithmic versed sines beyond those in the "Requisite Tables," which were given only to every ten seconds for nine hours, and in other works to minutes.

EXPLANATION AND USE OF THE TABLES.

N.B. Numbers are prefixed to the paragraphs for convenient reference thereto, and to prevent confusing them with the numbers prefixed to the Stars, they will be referred to as Articles *or abbreviated* "Art."*—thus see Art.* 3. *&c.*

TABLE A.

Catalogue of 45 *of the Principal Fixed Stars.*

1. Contains the right ascensions in time, and the declinations of forty five of the principal Fixed Stars including the North Pole Star, for the beginning of the year 1844, with their annual variations both in right ascension and declination. If the places of these Stars are wanted for any time after the beginning of the year 1844, multiply the annual variation both in right ascension and declination, by the number of years that have elapsed since that time; to the product, add such part of the annual variation as is passed of the current year, and the sum will be the variation from the beginning of 1844 to the given time. This variation must always be added to the right ascension for 1844; but the variation in declination must be added to or subtracted from the declination, according as the sign + or — is found against the annual variation in the last column of the Table, to give the right ascension and declination for succeeding years. If the places of the stars be wanted for any time before the beginning of the year 1844, the variation in right ascension must be subtracted from the right ascension found in the Table, and the variation in declination must be applied with a contrary sign to that which is put against it.

TABLE B.

2. Shows the approximate Astronomical Mean Time that Forty four of the principal Fixed Stars will culminate, or pass the meridian of Greenwich in the year 1844,—and the numbers taken from Table C, (printed in every alternate page with this Table,) are to reduce the culminations to other meridians in any year.

3. Another simple "Annual Correction," taken from Table F, will reduce the culmination sufficiently near to the truth for all Nautical purposes to the year 1864 inclusive;—hence the Navigator is furnished with daily and prospective assistance to know when to look out for the Meridional Altitudes of the Stars in order to get his Latitude,—and what is next in importance, a very brief method of finding the Time by the Altitude of the Stars, when they are at a proper distance from the meridian.

4. A number is prefixed, as a convenient reference to each Star, corresponding to those in the Catalogue Table A, with a dagger, (†), signifying the ones from which the Moon's distance is calculated and set down in the Nautical Almanac; and an asterisk, (*) to denote those of the first magnitude.

5. The Equation of Time is placed at the head of the Table to every day for 1844, and will serve *roughly* for any common year to reduce the culminations to Apparent Time when required. Other Tables of the Equation of Time will be found in the appendix to this volume.

6. The excess of the culminations above 12h. is so much time in the morning of the following day, in *civil* reckoning.

Example.—September 9th, 1844, No 10, culminates at 17h. 9m. 40s. mean Astronomical time, which is 5h. 9m. 40s. A.M., Civil time on the 10th, —therefore when observing between midnight and noon, *i. e.* A.M., the culmination (when wanted) must be taken out from the column of the preceding day.

7. All the fixed Stars culminate on some *one* day * of every year *twice*, which this table points out—therefore in the event of a double culmination taking place in the interval between two observations of the same star, a sidereal day or Revolution must be added, and the acceleration taken out from Table G accordingly.

8. *Example.*—Suppose No. 16, Star to pass behind a tower at 6h. 20m. 16s. P. M. by a Chronometer on the 11th, of March 1844, and again on the 24th, civil morning of September following it passes at 5h. 25m, 23s. by the same chronometer having been observed from the same position—*Query*, how has the Chronometer gone?

Operation.—The interval by Table S is 196 days, but this Star passed twice on the 30th, of June, therefore 196 + 1 = 197 Revolutions which in Table G, gives 12h. 54m. 32s. to be *subtracted* from what it showed 11th, of

	H. M. S.		H.	
March, namely. ——————	6.20.16	borrow	24	when necessary
197 Revolutions Table G =	12.54.32	sub.		
	————		H. M. S.	
Astro. Time 23rd, of September	17.25.44	=	5.25.44	A.M. 24th, civil time.
But the Chronometer showed——————			5.25.23	
Therefore it has lost			21 Seconds.	

9. It must be observed in Table B, that the culminations in each column are for that *astronomical day* under which they stand; but from their perpetually changing they could not be placed *in the order of time.* For *example,*— On the 1st, of January (see Table) No. 39 is the *first* Star that passes after noon, 40 is the *second,* and so on to 44 the one at the bottom of the table— the next is No. 1 *in the same column* at the top which passes at 5h. 18m. 28s. and in succession to the 38th Star, which culminates at 23h. 46m. 45s. and is the last for that Astronomical day; in like manner with every other day— always remembering that the culminations less than 12h. are for P.M. both in the Astronomical and Civil reckoning and that the excess of 12h. is so much time A.M. on the following *civil* morning.

10. *To find the time of the culmination of the Stars on any given day and place.*

---

* Or 24 hours of Mean Time.

Example.—At what time will α Lyra No. 38 culminate at Liverpool on the 29th of July, 1844?

Operation.—In page 32, and under 29, the given day, opposite to 38 the number of the Star is 10h. 1m. 6s.; at the same opening of the book and with the Longitude of Liverpool, say 3° W. take out the correction from Table C. which is 2s to be *subtracted* from the culmination agreeably to the rule at the head of that Table, which reduces it to 10h. 1m. 4s. the answer.

11. *Example.*—At what time will *Aldebaran* (No. 10) culminate, or pass the meridian of Dover on the 10th of January, 1849?

Operation.—In page 3, under the 10th day, and opposite No. 10, is 9h. 9m. 0s., and the correction for 1°.19′ East Longitude in Table C is 1s to *add,* because East; and for the year 1849 the Annual Correction found in Table F, is 2m. 50s. with the sign (—) to *subtract* from the culmination, therefore the *difference* of the two corrections 2m. 49s. reduces 9h. 9m. 0s. to 9h. 6m. 11s. the answer.

12. *Example.*—At what time will *Aldebaran* (No. 10) culminate on the same day (as in the last example), on the meridian of Dublin?

Operation.—The only difference in this Example is on account of the Longitude,—Dublin is in 6°20′ West; this gives in Table C 4½ *sub.* because West; both corrections being *sub.*; their *sum* 2m. 54½s. being *subtracted* from 9h. 9m. 0s. gives 9h. 6m. 5½s. the answer.

13. Thus it appears that *Aldebaran* will pass the meridian of Dublin 5½s. sooner, by the time there, although Dover is 7° 24′ to the East of the former,—which is equal to 29m. 36s. of Time.

14. Therefore in any part of England the correction from Table C can never exceed 5½ seconds to *subtract* at the Lands-end; to 1½ seconds to *add* at Lowestoff, and may be omitted or not, according as rough or more correct time is required.

15. *Examples for practice.*—What time will *Rigel* No. 12, culminate at Valparaiso, Calcutta, and Aberdeen respectively, on the sixth of August, 1844—their Longitudes being 72° W.—88° E. and 2° W.

Operation. In Table B it will be seen that No. 12, passes on the

	H.	M.	S.	
6th of August at Greenwich.	20	3	18	(α)
Long. 72° W. Table C, *sub.*			46	from (α)
Time at Valparaiso	20	2	32	
Long. 88°E. in Table C, *add*			56	to (α)
Time at Calcutta	20	4	14	
Long. 2° W. in Table C, *sub.*			1½	from (α)
Time at Aberdeen	20	3	16½	

16. Which are respectively the answers in Astronomical Time; or 8h. 2m. 32s. -8h. 4m. 14s. and 8h. 3m. 16½s. Civil Time on the morning of

the 7th. Thus it will be seen, that if using any of the Stars in the morning. and the culmination be required, it must be taken out for the day before and computed accordingly. But in the Afternoon, the Astronomical and Civil Time is the same, and therefore the culmination must be taken out for the day as in Articles 11 and 12.

17. From the foregoing examples it may be seen that in the whole breadth of England from East to West, which is 7° 28′ of Longitude, or 29m. 52s. of time there will not be more than 6 seconds of difference of *relative* time between any one Star's culmination at the meridian of Lowestoff, the eastern extreme, and its culmination at the Land's-end the western extreme—and that the same Star will pass 6 seconds *sooner* at the Land's-end by the time at that meridian, than it does at Lowestoff by the time at their meridian—hence when the time is wanted approximately it may be known by the passage of any of the Stars over the meridian, by observing its transit and referring to table B, correcting the culmination as set down in that table (for 1844) for any other *year* to 1864 as may be required by the annual correction in table F. Should the time be required more accurately, use the correction from table C. accordingly.

18. The student may be informed, with regard to *absolute* time, if it were possible at the Land's-end to hear a gun fired at Lowestoff at the instant say at six o'Clock, a star culminated there, it would be only 5h. 30m. 8s. by the Clocks at the Land's-end; but before the same Star reached the latter meridian, it would be 5h. 59m. 54s. allowing Six seconds for the acceleration of the Star: therefore in *relative* time, the Star passes six seconds sooner over the western than it does over the eastern meridian.

TABLE C.

19. This table is printed in every right hand page with table B, the middle column shows the correction* corresponding to every 4° of Longitude as the left hand argument, and the equivalents in time on the right hand. It is so connected with the matter in table B, and its uses conjointly exemplified with that table, that it requires only to say the correction must be applied to the culminations as directed at the head of the table, which stand opposite the Longitude of the place it may be required for—thus in 48° *West* Longitude the correction in p. 27 is 33s. to be subtracted from: and in *East* longitude it is to be added to the culminations of any of the Stars that are wanted on the days that appear at that opening of the book.

20. The corrections correspond to the average change of the Sun's right ascension for the times against which they stand—if the correction be wanted for more than 180° or 12h. it must be taken out for the excess, and added to what it is at 180° or 12h., which will then be the proper correction.

TABLE D.

21. Shows the culminations of *Polaris* (The North Pole Star) over the meridian of Greenwich approximately for every day of the year 1844, and like those in table B., are to be corrected for other meridians, by table C., in that opening of the book where the given day is found, and also for the annual correction for other years, found at the bottom of table F., these being applied as tables C. and F. direct, gives the culmination for the meridian and year accordingly.

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* In Minutes and Seconds.

22. *Example.*—What time will *Polaris* culminate at Greenwich and also at Canton in China, on the morning of the 2nd of June, 1843, by civil reckoning?—*Operation.*—It being morning take out the culmination of the day before (*i. e.* the 1st.) which is 20h. 19m. 49s. and in table F. p. 58, at the bottom, under 1843 is + 2m. 42s. which added gives 20h. 22m. 31s., the astronomical mean time at Greenwich, which is 8h. 22m. 31s. A.M. the 2nd. Then the Longitude of Canton is 113° 14′ E. which in table C. gives 1m. 17s. more to add because E., therefore the corrections being both additive makes the time of culmination at Canton 20h. 23m. 48s. or 8h. 23m. 48s. A.M. by civil reckoning, on the 2nd.

23. *Example.*—What time will *Polaris* culminate on the 10th. of January, 1844 at Greenwich and also at Jamaica on the same day. *Operation.*—In table D. p. 54, opposite 10th. January, is 5h. 45m. 53s. the answer for Greenwich.—Then Long. Jamaica, say 77° W. in table C, gives 56s. *sub.*, therefore the answer for Jamaica is 5h. 44m. 57s. as was required.—For any other year, to 1864, the annual correction table F. is the only *additional* trouble.

24. When *Polaris* (the pole Star) is on the meridian either *above* or *below* the pole, there will be no perceptible change of its altitude for 40 minutes, that is for 20m. before it comes to, and 20m. after it has passed the meridian,—consequently either of these cases are favorable for obtaining the Latitude by the Altitude of the Star.—Therefore when the horizon is not well defined, or when clouds are intercepting the Star, it is advisable to take several Altitudes of it, reading them off and moving the index of the instrument every time, so that no preference be given to one Altitude more than to another, except there be good reason for it.

25. Take the mean of the whole for the *observed* Altitude, and then proceed to find the Latitude, thus:

26. Correct the observed altitude, for index error, dip and refraction and you will have the true altitude—if the Star be above the pole, subtract the polar distance * from the true Altitude, but if it be below the pole add the polar distance to the true Altitude, and in either case you will have the Latitude accordingly. This rule holds good with any Star so observed.

27. The culminations in Table D. are the times when the Star is *above* the pole, and by adding 11h. 58m. 2s., to them (corrected as before shown) will give the times of the passage of the Star over the meridian *below* the pole. If the sum exceeds 24h. the excess will be so much time in the following astronomical day.

TABLE E.

28. This table shows the correction to be applied to the true altitude of the Pole Star for every minute of the semicircle. (12h.) The arguments for the first 6 hours being at the head and the minutes in the left hand margin—those for the last 6 hours at the bottom and the minutes in the right hand margin.

29. *Having the Altitude of the Pole Star, the Mean Time it was observed and the rough Longitude to find the Latitude.*

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* *i. e.* The compliment of the Star's declination, found in table A. p. 1.

30. *Rule.*—Take out from table D. the culmination of the Star and correct it for the Longitude by the quantity answering thereto in table C., and also for the annual correction found at the bottom of Table F. (for any other year than 1844, which Table D. gives) and you will have the corrected culmination, mark it c.c.; the difference between c.c. and the mean time at the Ship (always reckoned from the preceding noon), *being increased* by the quantity answering thereto in Table H, is the Star's hour angle, and argument for Table E; take out the correction, and apply it as the head or foot of that Table directs to the Altitude of the Star corrected for index error, dip and refraction, and you will have the Latitude nearly, which when greater accuracy is required *increase* it by the quantity found in table Z, opposite the Latitude, and under or over the corresponding hour angle.

TABLE Z.

The correction from this Table is always additive.

Lat.	H. 0	H. 1	H. 2	H. 3	H. 4	H. 5	H. 6
°	′	′	′	′	′	′	′
10	0·0	0·0	0·0	0·1	0·2	0·2	0·2
20	0·0	0·0	0·1	0·3	0·4	0·5	0·5
30	0·0	0·1	0·2	0·4	0·6	0·7	0·8
40	0·0	0·1	0·3	0·6	0·9	1·1	1·2
50	0·0	0·1	0·4	0·9	1·3	1·5	1·7
60	0·0	0·2	0·6	1·3	1·9	2·3	2·5
70	0·0	0·3	0·8	2·0	9·2	3·6	3·9
80	0·0	0·6	1·9	4·1	6·0	7·4	8·0
Lat.	H. 12	H. 11	H. 10	H. 9	H. 8	H. 7	H. 6

EXAMPLE.

31. November 4th, 1843, Suppose at 6h. 15m. P. M. meantime, the Altitude of Polaris corrected from index error, dip. and refraction to be 48° 15′, required the Latitude? Longitude 8° West.

	H. M. S.	
The Star passes meridian (Table D.) in 1844 at	10.6.34	
Long. 8° W. Tab. C, 5s. *sub.* An. cor. 1843, Table F, + 2m. 42s. = ...	+ 2.37	
Corrected culmination for 4th, November 1843 in 8° W.=c.c.	10. 9.11	} diff.
Given Mean Time at Ship	6.15. 0	
Difference	3.54.11	
Correction Table H, taken out with 3h. 54m. *always add* .,	38	
Star's hour angle, and argument for Table E.	3.54.49	

		° ′ ″
True Altitude of Polaris		48.15. 0
Correction Table E, 47′·2 = ...		*sub.* 47.12
Approximate Latitude		47.27.48
Correction Table Z, 1′·2	*always add*	1.12
Latitude by observation		47.29. 0 N.

32. *Example* 2.—March 6th, 1844, in Longitude 37° West, at 7h. 43m, 35s. Mean Time, let the Altitude of the Pole Star, when corrected from index error, dip and refraction be 46° 17′ 28″: required the Latitude?

	H. M. S.	
The Star culminates by Table D. at	2. 5.44	
Corrction for 37° West Longitude Table C.	*sub.* 23	
Mean Time Star culminates in 37° W. .... c. c.	2. 5.21	diff.
Given Mean Time of observation	7.43.35	
Difference	5.38.14	
Correction Table H, taken out with 5h. 38m. = ...	*add* 55	
Hour angle and argument for Table E.	5.39. 9	

	° ′ ″	
True Altitude of the Star	46.17.28	
Correction from Table E. 8′·3 = ...	*sub.* 8.18	
Approximate Latitude	46. 9.10	
Correction Table Z. 1′·5 = ...	*add.* 1.30	
Latitude corrected	46.10.40	N.

This is the same as the Nautical Almanac makes it, p. 590, 1844.

33. Remark, about every third year Polaris' declination increases 1′,* and consequently the Polar distance will decrease as much, table E will therefore be in excess 1′ when the Star is on the meridian in 1849, but less in every other position. To obviate this circumstance, proceed thus: in 1849 the Stars declination will be 80°.30′.16″. and its polar distance 1°.29′.44″. say 1°. 30′ = 90′ the last quantity must take place of that in the first column of the Table E, then for the other terms in the Table: in the common traverse Table and with every 4th, minute of time turned into degrees (by Table IX.) and the Polar distance 90′ taken in a distance column, the corresponding diff. of Latitude will be the correction of every 4th, minute of time or 1° of arc; the intermediate quantities will be readily valued.

34. *Example.*—What will be the quantity in the Table E, for 1 hour or 11 hours? 1h.=15° and 15° taken as a course and the polar distance, 90′ gives 86′·9=1°.26′·9 or 1°.26′.54″ the proper quantity for 1 or 11 hours.

35. *Example* 2.—What will be the quantity for 1h. 4m. or 10h. 56m? 1h. 4m.=16° which with 90′ polar distance, gives 86·5 diff. lat. = 1.°26.5″ or 1h. 26m. 30s. the intermediate numbers will be 1.°26·8, 1.°26·7, and 1.°26·6 respectively, and thus the whole Table may be corrected in a *morning watch below,* when it is required.—The student may be told, The Tenths in this Table or any other, are converted to seconds by multiplying them by 6, thus 1.°26·8 is 1°.26.48″

TABLE F.

36. This Table contains Annual Corrections to be applied to the culminations in Table B, from the year 1843 to 1864 inclusive; the years being the head arguments of the Table, and the number of the Star in the left-hand margin, corresponding with the Stars and their numbers as in the catalogue Table A, except the North Pole Star, which is found in the bottom of the Table F. The limitation to 1864, is purely accidental, and may be extended without material error through the century by four-yearly differences.

37. *Caution*: The Table occupies four pages, the first two are for the months of January and February only,—the last two pages are for March to December inclusive. *For Example*: The correction for *Rigel,* No. 12. in January and February, 1845, is 2m. 55s. *(to subtract),* and for March to December it is + 1m. 0s. *(to add).* The mistaking of these numbers would

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* See Table A.

cause an error equal to their sum, which in Longitude would be 58′.45″ and might be attended with serious consequences. A narrow fold of thin paper enclosing the edges of the two leaves *not in use*, will probably be the surest means of providing against a hasty reference.

TABLE G.

ACCELERATION OF THE FIXED STARS.*

38. This Table exhibits the accumulated daily acceleration of the Fixed Stars from 1 to 385 sidereal revolutions of the earth upon its axis. It has been extended to complete the filling up of the last column. By subtracting the terms therein from 24 hours, it will show the corresponding amount of time in which the revolutions are made, and that a well-regulated Mean Time Clock should indicate; consequently by observing the passage of a Fixed Star's transit over the wires of a telescope placed in the plane of the meridian, or even two or three points of the compass out of that circle: the instrument being undisturbed, will show the error of the Clock or Chronometer from 1 to any number of observations that are made by the same Star; and when one Star is inconvenient another may be made use of with the same precaution as to the position of the instrument, *but the nearer the meridian the better.*

39. As has already been observed in the Introduction, by means of this Table the rate of a Chronometer may be ascertained *on shore*, much more accurately than by Altitudes, on account of the uncertainty of the state of the atmosphere. In the method here suggested, having the wires of the telescope placed *vertically* and the instrument near the meridian, the effect of refraction will have no effect on the time of the passage of a Star behind the wires of a telescope, nor upon the perpendicular side of a tower or other building as exemplified in pp. 60, 61, in the absence of a telescope; which latter method well managed, will be preferable to that by Altitudes on account of the variableness of the refraction and errors of observations; and for this reason, when *accuracy is required*, the immersion of a Star behind a horizontal line or hill should be avoided.

40. It is presumed that these methods may be not only useful to the Mariner to examine the rate of his Chronometer on shore, but to Chronometer Makers and all other persons who are curious and desirous of knowing the error of their Clocks, which being once set to true Mean Time may be duly examined by the use of this Table at any future period, or if by accident suffered to run down, may by the same process be set again to true Mean Time, at the same place.

41. The following examples are from observations made by the author from the eastern inner edge of a ground-floor window, having an aspect about S. by E. ½ E. true bearing, nearly opposite to which is an upright side of a house whose Altitude is 30° with an opening to the eastward giving opportunity to see any Star approach whose Altitude does not exceed 30° when it arrives at the side of the house.

42. *Example,*—January 27, 1842, I observed Sirius, No. 16, disappear behind the end of the house at 8h. 33m. 40s.; intending to learn how my Chronometer was going, and on the following evening, having my eye in the same place, (the eastern side of the window,) I observed it to disappear again at 8h. 29m. 46s.: *Quere*, How has the Chronometer gone?

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* See Articles 7 and 8.

		H. M. S.	
January	27th, Time of 1st Observation....	8.33.40	by Chro.
	28th, Time of 2nd Observation ...	8.29.46	do. do.
	Observed acceleration of Star	3.54	
	Tabular acceleration	3.55·9	
	Gain of Chronometer............	0. 1·9	

It is evident the Chronometer has gained, for instead of 8h. 29m. 46s., it should have shown only 8h. 29m. 44s·1 on the 28th, when the observed and tabular acceleration would have been alike. This is but one of many hundred observations for the same purpose.

43. Sirius, No. 16, being the largest of the fixed Stars, may be seen with a common telescope in any clear day, when it is about 3 hours before or after the sun. The writer yesterday made this observation (April 11, 1843) in bright sunshine near the meridian, *knowing the exact brick of a neighbouring chimney behind which the Star passes;* this was ascertained by observing the Star, from the same position, in the twilight previously, and so long as the buildings remain will be a perpetual means of knowing the true time, either in rating a Chronometer or for the due examination of domestic Clocks.

44. Such persons as have not a convenient mark for the southern portion of the heavens, may use the northern with other Stars; but the first is best in England or in North Latitude, and the latter in South Latitude.

TABLE H.

45. This table is for reducing *intervals* of SIDEREAL TIME to equivalents in MEAN TIME.—It is extended for every minute of 24 hours to prevent the tediousness of taking out, sometimes, *three* quantities instead of *one*, and thereby rendering the chances of error proportionately less—tenths of seconds are excluded for the same reason, as being unnecessary at sea, and only required by first-rate astronomers on shore.

46. The reduction of MEAN TIME *intervals* into SIDEREAL TIME equivalents may be performed sufficiently near for all nautical purposes by the converse operation, since the whole difference in 24 hours is only 0s·64.

47. *Example.—Reduce* 8h. 44m., *Sidereal Time, into Mean Time.*

Under 8h., and opposite to 44m., is 1m. 26s. to be *subtracted,* which reduces 8h. 44m. to 8h. 42m. 34s., the Mean Time required.

48. *Conversely. Example.—Reduce* 8h. 42m. 34s., *Mean Time, into Sidereal Time.*

49. Under 8h., and opposite 42 and 43m., the quantity is 1m. 26s., which *added* to 8h. 32m. 34s. reduces it to 8h. 44m., the Sidereal Time required.

49. This table will be found very useful in computing the Mean Time by an altitude of a Star, as by the following examples.

50. Let the hour-angle (H. A.) of Arcturus, No. 29, computed from its true Altitude on the 13th of April, 1844, when East of the meridian, be 4h. 39m. 19s., the Latitude 49°. 30′ N., and Longitude 15° West.

TO FIND THE MEAN TIME.

	H. M. S.
H. A. of Arcturus 4h. 39m. 19s. East of the meridian.	
Reduction Tab. H. *sub.* 46 Reduced hour-angle	4.38.33
Culmination of Arcturus, Table B, 12h. 39m. 24s.	
Cor. for 15° W. Long., Table C........ *sub.* 9s. = c. c.	12.39.15
Mean Time at the place of Observation................	8. 0.42

51. Again, with the Star West of the meridian on the same astronomical day.

	H. M. S.		H. M. S.
H. A. as above....	4.39.19	West of the meridian.	
Reduction Tab. H.	*sub.* 46	Reduced hour-angle	4.38.33
Cul. of Star	12.39.24	Less 9s. as above = c. c..	12.39.15
Mean Time at the place of Observation...............			17.17.48

52. In the above examples, it will be observed, that the Mean Time is deduced without using either the Greenwich date, the right ascension of the Sun or Star, the Sidereal Time at Mean Noon or the Equation of Time, which by other methods are more or less necessary, *and require reduction;* whereas in this method the corrections are all taken out by simple reference and without mental exertion, making it an easier operation to find the Mean Time by a Star's Altitude, than by an Altitude of the Sun.

53. A similar convenience takes place in computing the Altitude of a Star, having the Mean Time and the usual *data* given. The hour-angle is found by the following rule.

54. *Rule.*—The *difference* between the corrected culmination and the Mean Time at the place of observation, being *increased* by the quantity answering to the said difference found in this Table, gives the hour-angle.

55. *Example.*—April 13th, 1844, Lat. 49°. 30′ N. Long. 15° W., at 17h. 17m. 48s., Astronomical Time, or 5h. 17m. 48s. A.M., the 14th by civil reckoning. What is the true and apparent Altitude of Arcturus, No. 29?

	H. M. S.		
Culmination Table B for 1844 =	12.39.24		
Long. 15° West, Table C......	*sub.* 9		
Cor. cul. in 15° W............	12.39.15		
Mean Time given.............	17.17.48		
Difference..................	4.38.33		
Reduction Table H	*add* 46		
Hour-angle of the Star........	4.39.19	ris.	4.81636
Co-lat..........	40°.30′ N. sine.............		9.81254
Star's Dec. Tab. A.	20. 0 N. co-sine..........		9.97299
Star's Mer. Alt...	60. 30 nat. sine 87036		
	nat. num. 39985	log.	4.60189
Nat. sine Star's true Altitude......	47051	=	28°. 4′. 0″
	Refraction	+	1.49
Star's apparent Altitude..................			28. 5.49

TABLES I AND K

56. Contain the True Meridional Altitudes of the 44 Stars that are above the horizon, corresponding to 60° of North and South Latitude, *opposite* to which they stand, and *under* their respective numbers at the top of each column, for 1844.

57. The use of them is, to assist the Mariner in finding out the proper Star to observe—for having the time of their coming to the meridian given in Table B, and their Altitude to every even degree of Latitude in these Tables, together with the letters N. or S. in each column, signifying whether they be North or South of the observer: a mistake is not likely to occur in selecting the right one; particularly if due regard be had to the bearing of the Star, which the learner must understand is always *true* North, or *true* South of the Ship when it is on the meridian.

58. Consequently, if in a place where there is known to be (say) two points of westerly variation, the meridian *by the compass*, will be N.N.E. or S.S.W. according as the Star be North, or South of the observer: and when it will have its greatest Altitude, unless below the pole, when it will have its least Altitude; in which case *see Art.* 26.

59. As the declinations of the Stars all change more or less, their meridional Altitudes must change by the same amount. These quantities are given approximately at the bottom of each column, with the signs + or — else — or + if + or — it means the upper Altitudes are to be increased 1′ and where the letter changes in the column, those below the change are to be diminished 1′ in the number of years specified. If — or + the reverse operation takes place; the *first* sign always to be applicable to the *upper* Altitudes, and the *last* sign to the *lower* ones.

60. *Example.*—The Star *Algenib* No. 2, at the Equator (Lat. 0°) is 75° 41′N. The correction at the bottom of the column *p.* 64 is — or + in 3 years, therefore in 1847, from 0° Lat. to 14° Lat. inclusive, the Altitudes are to be *lessened* 1′, and those from 15° to 60° Lat., both inclusive, are to be *increased* 1′, and so of any other Star, having regard to their signs.

61. If an observed Meridional Altitude corrected for index error, dip and refraction, be compared with the Tabular Altitudes, the Latitude appears at once without calculation.

62. *For Example.*—Suppose No. 2, Star's true Meridional Altitude be 81° 2′ N., the Latitude would be 5° 21′ N. since at 5° of Lat., the Mer. Alt. is 80° 41′, and it increases in going down the column; and as 81° 2′ is 21′ more than 80° 41′, the Latitude is evidently 5° 21′ N. Let the same Star's true Mer. Alt. be 89.° 30′ S., it is clear the Latitude is 14° 49′ N.

63. When the old rule is preferred, here are the figures in juxta position for both examples.

	° ′			° ′	
True Mer. Alt,	81. 2	N.	true Mer. Alt.	89.30	S.
Zenith Dis...	8.58	S,	....	0.30	N.
Declination ..	14.19	N.	found at bottom Tab.	14.19	N.
Latitude	5.21	N.	....	14.49	N.

TABLE L.

64. This Table shows the approximate *Apparent Time, from noon,* when the Stars of the first magnitude may be observed by the naked eye, in the evening twilight, from the equator to 60° of Latitude when it is of the same or of a contrary name to the Sun's declination; the latter term being the argument for the top of the Table, and the Latitude the argument on either side of it. For its morning use, see the head of this Table.

65. Such a Table may by some be considered superfluous, but in practice they will find it otherwise. Few persons, that are not habituated to observing the Stars, would believe they could be seen so early in the evening or kept in sight so late in the morning as they may be; the Author has "many a time and oft" observed their Altitudes both at sea and on shore with the unassisted eye, and better still with the direct telescope, when the Sun has not been more than four degrees and a half below the horizon. This subject is so often persisted in, that it is hoped it will be excused on the assurance of the personal experience of its utility.

TABLE M.

66. This Table is particularly computed for using in the British Channel, as being the most frequented place for Ships of all nations, beyond any other on the face of the globe. It is adapted to *Mean Time,* and is sufficiently explained at the head of it. Thus to know what Stars will be convenient to observe in the evening twilight, say on the 5th of January of any future year,

67. In p. 75 opposite the day and under "Evening Twilight," No. 10 Star is about 24° high, and *bearing by compass* E.S.E. ½S. and No. 38 is 34° high, and bearing N. W. at 4h. 42m., Mean Time, as seen at the earliest time, as expressed in the proper column; and No. 1 is approaching the meridian to the South, which is further confirmed by reference to Table B, where the exact time is ascertained by Arts. 10, &c.

68. The figures 19h. 28m. in the same rank, are astronomically written, and signify 7h. 28m. on the morning of the 6th by civil reckoning.—and the like on any other day.

TABLE N.

69. Is adapted to the same parallel as Table M, but in order to make it answer for the whole circle, the approximate *true bearing* of the Stars is given instead of the compass bearing to certain ones, when others, so signified, are on the meridian; the time being found by Table B, as above.

TABLES O. AND P.

70. These Tables, like their predecessors, are to assist the Mariner in finding both Latitude and Time. O, for 10° North Latitude, intersecting the Bay of Bengal, China Seas, &c.—and P, for the use of Ships in the Mediterranean Sea,—off Cape St. Vincent,—Chesapeake, &c.

TABLES Q. AND R.

71. *For finding the Latitude at Sea from the Altitudes of Fixed Stars observed at the same time.*

These Tables were invented by the late Archdeacon John Brinkley, D. D. F. R. S. *Andrew's Professor of Astronomy in the University of Dublin,* by whom they were kindly presented to the Author. They are published in the Nautical Almanac for 1825, and prefaced with the following observations:

72. *By the Altitudes of Two Stars.*

"The following method of computing the Latitude appears to possess advantages that will be found valuable to the Seaman.

The Observations are the Altitudes of a pair of Stars to be selected from the several pairs in the Tables here given. The Altitude of one Star may be taken, and the Time of Observation noted by a watch; then the Altitude of the other Star, and the Time noted; and then again the Altitude of the second is to be taken, and the Time noted. The change of Altitude and intervals of Time will serve for computing easily by common proportion, the Altitude of the second Star at the instant the first was observed, as the Observations need occupy only a few minutes. Indeed, the interval, between the two Observations of the second Star, may be taken equal to that between the Observations of the first and second, and no proportion required.

The difficulty of distinguishing the horizon at Sea when the Stars are visible will considerably circumscribe the utility of this method; but on moon-light nights, and during the twilight of morning and evening, great opportunities are afforded for observing the bright Stars that have been selected.

73. *The advantages offered by this method are,—*

1. The inconvenience is avoided of having to wait for a considerable interval of time to complete the Observations, as in the method of finding the Latitude from two Altitudes of the Sun and the time between, when often by the intervention of Clouds the first Observation becomes useless.

2. No allowance is necessary for the change of place of the Ship as in that method, and no inaccuracy takes place for not allowing for the change of declination.

3. The same Observations serve *for finding the Time*, so that the Time may be found at the same instant as the Latitude.

4. The shortness and simplicity of the computation. These may be reckoned the principal advantages of this method. The finding the Time from the Altitude, the Latitude, and Declination, is an operation with which seamen are familiar. The chief part of the computation in this method consists only in two operations, exactly similar to the operation for finding the Time.

Precaution—To insure greater accuracy, the Stars, when near the zenith, should not be used; and with reference to finding the Time, the Star *F* should not be near the meridian.

In the Tables, *N* denotes the Star *nearer* the elevated Pole, and *F* the Star *farther* from it.—

74. RULE.

1. The Altitudes of the two Stars being corrected for dip and refraction, the Altitude of the Star *F* is to be subtracted from 90° to find its Zenith distance.

2. From the natural co-sine of the difference of this Zenith distance of the Star *F* and distance *D* (*vide* Tables) subtract the natural sine of the Altitude of the Star *N*. To the log. of the remainder add the secant of the Altitude of the Star *F* and co-secant of *D*, the sum is the log. rising of an arch which is to be reduced to degrees and minutes, and called *G*.

3. From the natural co-sine of the difference of the Zenith distance and Polar distance of Star *F*, subtract* the natural sine of the Latitude by account. To the log. of the remainder add the secant of the Altitude of the Star *F*, (already found,) and the co-secant of the Polar distance of the same Star. The sum is the log. rising of an arch which is to be reduced to degrees and minutes, &c., and called *H*.

4. The sum or difference of *G* and *H*, if the Latitude by account be exact, will be equal to the angle of comparison *C*, otherwise only nearly equal. No difficulty can arise whether the sum or difference is to be used, as the *nearer* agreement of the result with the angle *C* will afford sufficient information.

$$C\begin{cases}\text{greater than } \textit{Sum}, & \text{mark Error } S.\\ \text{less than } \textit{Sum}, & \text{mark Error } A.\end{cases}$$

$$C\left\{\begin{matrix}\text{greater than } \textit{Diff.}\\ \text{\& } G \text{ greater than } H.\end{matrix}\right\}\text{ mark Error } A.$$

$$C\left\{\begin{matrix}\text{greater than } \textit{Diff.}\\ \text{\& } G \text{ less than } H.\end{matrix}\right\}\text{ mark Error } S.$$

$$C\left\{\begin{matrix}\text{less than } \textit{Diff.}\\ \text{\& } G \text{ greater than } H.\end{matrix}\right\}\text{ mark Error } S.$$

$$C\left\{\begin{matrix}\text{less than } \textit{Diff.}\\ \text{\& } G \text{ less than } H.\end{matrix}\right\}\text{ mark Error } A.$$

5. Add the log. (using only three places) of the Error in minutes, the sine of *H* and the secant of the Latitude by account together. From the sum subtract the sum of the secant of the Altitude of the Star *F*, and the co-secant of the Polar distance of the same Star (both already found). The remainder is the log. of a correction of the Latitude by account, to be added when the Error is marked *A*, and to be subtracted when marked *S*.

75. *N. B.* It will usually happen at Sea, that the Latitude by account will be sufficiently exact to give the true Latitude by one operation. But a repetition, commencing with paragraph 3, will be found so very short, that it may be generally advisable to use a second operation; either for the purpose of obtaining the Latitude more exactly, or for a Proof.

It serves for a proof when the Latitude by the first operation does not differ a minute from the new Latitude, and for a sufficient correction when the difference is greater; which correction may be also proved, if it be thought necessary, by again finding the angle *H* with the second corrected Latitude.

76. The Latitude being thus found, the Altitude of the Star *F* will be convenient for finding the Time, provided it be at a considerable distance from the Meridian. The Star *F* is mentioned, because its Polar distance and Right Ascension are in the Tables.

"Capt. Lynn's Tables lately published, in which "the log. rising" is given to seconds of Time, will be found exceedingly convenient for the practice of this method. In fact, it was his remarks relative to the opportunities of taking exact Altitudes of the brighter Stars during the time of Twilight, that induced me to endeavour to investigate an easy process for finding the Latitude from the Altitudes of two Stars."

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* It is supposed here that this difference is always less than 90°. The very rare case when greater, is easily avoided; or if not avoided, instead of subtracting, add.

TABLES Q. AND R.

Case of Latitude by the Altitude of two Fixed Stars.

77. EXAMPLE.

Corrected Alt. Spica (N) 51°36′ }
Antares (F) 42. 1 } North Lat. by acc. .... 17°40′

90° 0′
Alt. Star F 42. 1

Zen. dis. 47.59
D ...... 45.54 from Table Q.

Difference 2. 5 nat. cos. 99934
Alt. Star N 51.36 nat. sin. 78369

Difference 21565

Its Log. 4.33375
Alt. Star F. sec. .... 42°1′ = 10.12904
D. 45°54′ co. sec. 10.14380

Log. ris 3h. 33m. 43s. 4.60659

P. D. Star F. 116. 4.47 Tab. Q.
Z. D. Star F. 47.59. 0 = comp. alt.

Difference (*a*) 68. 5.47 n. cos. 37305
Lat. by acc. .. 17.40. 0 n. sin. 30348

Difference 6957

Its log. 3.84242
Alt. Star F. sec. 10.12904 }
P.D.St.F. co-sec. 10.04664 } (*b*) .. 20.17568

Log. ris. 1.45.35 4.01810 = H 26°23′45″
= 53°25′45″ = G .... G 53.25.45

SECOND OPERATION.

Lat. by 1st. oper. 18°0′54″ n. sin. 30926
(*a*) found before. nat. cos. 37305

Its log. ...... 3.80475 n. num. 6379
(*b*) found before 20.17568

Sum .... 3.98043 ris. 1.41.2
1h. 41m. 2s. = 25°15′30″ = 2nd. H.
G. found before 53.25.45

Sum .... 78.41.15 }
C. .... 78.42.16 } Diff.

Error S. .... 1. 1 log. 0.000
2nd. H. 25°15′30″ sin. 9.630
Lat. .. 18. 0.54 sec. 10.022

Sum 19.652
(*b*) already found .... * 20.176

Log. .... 0′ ·3 n. num. 9.476
= .... — 0′ 18″
Latitude 18. 0.54 by 1st operation

Latitude 18. 0.36 N. twice corrected

Sum 79.49.30
C. taken from Tab. Q. 78.42.16
67 ·2 = Error A 1. 7.14

67 ·2 its log. 1.827
H. 26°24′ found above sin. 9.648
Lat. acc. 17°40′ sec. 10.021

sum 21.496
(*b*) found above 20.176

Nat. num. 20′ ·9 .... log 1.320
Lat. acc. 17.40. 0

Lat. .... 18. 0 ·9 = 18° 0′ 54″ North.

Remark.—The 2nd operation will rarely be necessary, but it is worked out to show the learner the whole process, and the great ease with which the Latitude may be computed.

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* When (*b*) is greater than sum, borrow 10 in the index of sum, as in this example. The remainder having index 9, shows the natural number to be less than 1′: if the index had been 8, it would have been still less; and therefore need not be regarded: but, as in the latter part of the first operation, the number answernig to the log. 1.320 is 20′·9 which is important. Had it been 0.320 the number would have been 2′·09 accordingly.

*

TABLES Q. AND R.

Second case of Latitude by the Altitudes of two Fixed Stars.

78. EXAMPLE.

Corrected Alt. of Sirius (F) 64°.37.12″ }
β Argus (N) 49.59.57 } Latitude by account 29°0′ S.

90°. 0′
Alt. Star F. .. 64.37

Z.D. Star F. .. 25.23
Distance .... 57.43 found in Table R.

Difference .. 32.20 nat. cos. 84495
Alt. Star N. .. 50. 0 nat. sine 76604

Log. .... 3.89713 nat. num. .. 7891
Alt. Star F. 10.36787 secant
D. Tab. R. 10.07289 co-sec. (57°43′28″)
H.M.S.
Log. ris. .... 4.33789 2.34.7. = G.38°.31′.45″
Already found H. 56.17.15
Diff. G. and H. 17.45.30

P.D. Star F. .. 73.29.36 found in Tab. R.
Z.D. Star F. .. 25.23. 0 = comp. alt.

Difference (*a*) 48. 6.36 nat. cos. .. 66770
Lat. acc. .... 29. 0. 0 nat. sine .. 48481

Log. .... 4.26219 nat. num. 18289
Alt. Star F. sec. 10.36787 }
Star F.P.D. co.sec. 10.01828 } (*b*)=20.38615
H. M. S.
Log. ris. 3.45. 9 4.64834 = H. 56°.17′.15″

C. ang. comparison 15.10.52 found in Table R.
Error A. ...... 2.34.38 = 154′·6 log. 2.189
H. 56°17′ sin. 9.920
Lat. 29° 0′ sec. 10.058

sum 22.167
(*b*) found before 20:386

Nat. num. 60′·5 .... log. 1.781
= 1. 0.30
Lat. acc. 29. 0. 0
Latitude 30. 0.30 S.

⁎ Notwithstanding the Latitude by account is 60′ in error, the Latitude is found by one operation within half a mile of the truth, and confirms the N.B., Art. 75.

In cases where Meridional Altitudes cannot be obtained, this method will be found both simple and convenient.

TABLES S. AND T.

79. These Tables are chiefly for getting the interval between any two days of the year, on which observations of the Stars have been made &c. Thus from the 12th. of January to the 16th. of May, in a leap year, the lesser number 12 being subtracted from that answering to the 16th. of May, which in Table S. is 136, the interval is therefore 124.—See p.p. 60 and 61, also Arts. 38 to 40, &c.

TABLE Z.

80. This Table will be found under Article 30, where it is sufficiently explained.

For finding the Latitude, by the observations made in the Lunar method, or from the observed Altitudes of the Moon and Sun, a Fixed Star, or Planet.

81. The advantages of this method are,—

I. That at any time of the day, when the Sun and Moon are both visible, the Latitude can be found by exactly the same Observations as are made for finding the Longitude; or the Lunar Distance needs not to be observed, but may be taken from the Nautical Almanac if the Latitude only be the object of inquiry. This great extension of the opportunities for finding the Latitude will, it is hoped, be considered as of importance.

II. If the Sun or Star be at a considerable distance from the Meridian, the Time can also be found.

82. The process is rather longer than the preceding, for two Stars, because here we have to compute the angle of comparison, *C*.

The computation of the true Lunar Distance gives *D*, and the same computation either actually finds or renders very simple the finding of the true Altitudes; and by the Nautical Almanac the Moon's and Sun's Polar Distances (from the elevated pole) may be computed.

83. If the Lunar Distance be not observed, it may be easily computed from the Naut. Alm: by the Greenwich Time shown by the Chronometer or otherwise, with sufficient accuracy to compute the Lunar Distance for this problem, thus:—

84 *Rule.*—Seek those two distances, opposite the given day in the Almanac, which stand under the hours that *include* the Greenwich Mean Time, call the *first* of these hours *(a)*, and the distance standing under it *(b)*; also let the second hour be called *(c)*, and the distance under it *(d)*, to the pro. log. of the difference between *b* and *d*; (found standing between them in the Almanac;) add the pro. log. of the difference between *a* and the given time, the sum is the pro. log. of a portion of an arc to be added to *b* when the distance is increasing, or to be subtracted from *b* when the distance is decreasing.

85. *Example.*—What is the distance of the Sun and Moon at 4h. 30m. 10s. on the 15th of October, 1844?

Opposite 15 days and under *(a)* IIIh. is *(b)*	50° 13′ 38″ and	p. l. 2470
Diff. between *a* and given time ...... =	1h.30m.10s.	p. l. + 3002
Portion of an arc to be *added* to *(b)*	51′ 4″	p. l. = 5472

Required distance at 15d. 4h. 30m. 10s. = 51° 4′ 42″ of Sun and Moon.

86. *Example.*—What is the distance of Saturn at the same time at Greenwich?

		° ′ ″	
Under (*a*) IIIh. is	(*b*)	48.11.59	p. l. 2185
Diff. between (*a*) and given time		1.30.10	p. l. + 3002
Portion of arc *subtract* from (*b*)		54.31	p. l. 5187
Required distance		47.17.28	of Sat. and Moon.

87. The observed Altitudes may be corrected in the usual way. For the Moon's Alt., *see Appendix*, Table VIII. For a Star or Planet the dip, Table X, and refraction, Table XIV, must be always *subtracted* from the observed Altitude; and the index error of the instrument must be applied to all angles that are observed by it.

88. The angle of comparison C, is computed by the following Rule, after which the Latitude is to be found, exactly in the same manner as when two Stars are observed.

89. The object that is further from the elevated Pole is to be called F, and the other N.

90. *Rule to find the Angle of Comparison, C.*

From the natural co-sine of the difference of the Polar Distance of F and distance D, *subtract* the natural co-sine of the Polar Distance of N; if the difference and Polar Distance of N be both greater or both less than 90°, otherwise take their sum.

To the logarithm of this difference or sum add the co-secant of the Polar Distance of F and the co-secant of D, the sum is the logarithm rising of an arc which is to be reduced to degrees, &c., and called C.

91, *Example.*—August 7th, 1844, Lat. 30° 0' N. Long. 45° W. What is the angle of comparison for the Sun and Moon at 9h., A.M. Civil Time.

	D. H. M.	
Operation.—Given time at the Ship	6.21. 0	
Long. 45°, in Time	= 3. 0	
Greenwich Mean Time........	7. 0. 0	or noon.

At which Time the Dist. D in Naut. Alm. is 75°.15'.56"
The Sun's dec. is 16° 21' N. Moon's dec. 21. 9.38
P.D. of F..... 73. 39 P.D. of N....... 68.50.22

	° ' "			
P. D. F. = ...	73.39. 0	co-sec.		10.017928
D.	75.15.56	....		10.014522
Difference	1.36.56	n. cos.	99960	
P. D. N.	68 50.22	n. cos.	36098	
			63862	4.805243

Angle of Comparison C. 71°49'45" = 4h.47m.19s. ris. 4.837693

92. *By Sun and Moon.*

7th August, 1844, about 9h. A. M. Lat. 29° 30′ N. Long. 45° West.

True Alt. Sun	F.	....	45°.34′.50″
True Alt. Moon	N.	....	58.22.40

Alt. Star F	45°.34′.50″		
Z. D. F.	44.25.10		
D.	75.15.56	Naut. Alm. noon	
	30.50.46	n. cos.	85855
Alt. N.	58.22.40	n. sin.	85152
		n. num.	703
		log.	2.846955
Alt. F.	45.34.50	sec.	10.154960
D.	75.15.56	co-sec.	10.014522

G. = 8°16′ = 33m. 4s. = 3.016437

Observe.—Although the Lat. by Acct. is 30′ in error, one Operation discovers the true Latitude.

P. D. F.	73°.39′ 0″		
Z. D. F.	44.25.10		
	29.13.50	n. cos.	87265
Lat. acc.	29.30	n. sin.	49242
		diff.	38023
		log.	4.580046
20.172888 *b* }		alt. F. sec.	10.154960
		cos. P.D.F.	10.017928
H. 64°17′15·	4h.17m.9s.		4.752934
G.	8.16. 0		
	72.33.15	sum.	
	71.49.45	C. ang. Comp. Art. 91.	
	0.43.30	Error A.	
43′ 30″ = 43 ·5	log.	..	1.638
H. 64°17′	sin.	..	9.955
Lat. 29.30	sec.	..	10.060
		sum	21.653
		(*b*)	20.173
= 30′ log.			1.480

The true Lat. 30: 0 N.

*** *For Latitude by Trial and Error, see Index to Appendix.*

93. The most simple means, however, of finding the Latitude, is by observing the Meridional Altitude of any celestial object whose declination is known. The reason of this simplicity may be thus *practically* explained.—When any celestial object (to use sea language), *is up,* it is at that instant either immediately in a straight line between the observer and the equator, or the observer is immediately between the object and the equator;—this line is called a meridian. Now in the first case it is evident the observer is farther from the equator *(whence the Latitude is reckoned),* than the object is; and in the latter case, he is nearer. And since latitude and declination are of corresponding value on a meridian, the sum or difference of the object's declination and the observer's place must be the Latitude.

94 . *Example.*—Suppose the *true* Meridional Altitude of either Sun, Moon, or Star be observed = to 75° 10′ South of the observer, when its declination is 22°30′ N. *Quere,* What is the Latitude of the observer?

Operation. The Meridional Altitude being subtracted from 90°, leaves 14° 50′ the zenith distance, which in other words is the distance the observer is (measured on the meridian), from where the object would be vertical, or over head. Now the object being 14° 50′ to the South of the observer, and the object 22° 30′ North of the Equator, it is evident the *sum* of the two quantities is the Latitude, 37° 20′.

Had the object been North of the observer, and the declination the same, the *difference* of the two quantities would be the Latitude = 7° 40′ N.

In Figures, thus :

	° ′			° ′	
Mer. Alt.	75.10.	S.	Mer. Alt.	75.10	N.
Zenith distance	14.50	N.	Zenith distance ..	14.50	S.
Declination	22.30	N.	Declination	22.30	N.
Latitude	37.20	N.	Latitude	7.40	N.

Hence the following certain

95. *Rule.*--If the object be to the North of the observer, call the Zenith distance South. But if it be South of the observer, call the Zenith distance North. Then if the Zenith distance and Declination of the object be both North or both South, their sum is the Latitude; but if one be North and the other South, their difference is the Latitude of the same name as the greater.

96. When these quantities are equal and their names different, the observer is immediately on the Equator. Again, if the observer's Latitude and the object's declination be equal and of the same name, the object will be vertical when on the meridian; thus, let the declination be 20° 30′ N., the Latitude will be 20° 30′ N. also.

MEAN TIME.

97. A due knowledge of the true time of the day whether at sea or on shore, is always more or less desirable. At sea, its acquirement either by means of the Sun's or a Star's Altitude (rules for which will be found in this work), is so simple, that a youth who has learned the first four rules of arithmetic will have no difficulty in the computation, and with little practice will easily make the observation.

98. Mean Time, or *Equal Time,* is that which is measured by a well regulated Clock, and it is that by which all Clocks for Civil purposes are or should be regulated—it is distinguished from *Apparent* Time, (in quantity) by the amount of the Equation of Time, arising from the unequal motion of the Earth or Sun. This equation of time is given at the head of Table B, and also in Tables XVII. to XX. in the appendix, where the latter Tables are duly explained

99. Apparent Time is regulated by the apparent motion of the Sun, which is subject to perpetual variation, depending on the obliquity of the

ecliptic to the equator and to the eccentricity of the earth's orbit. This variation is denominated the Equation of Time, *see art.* 101. A well constructed and accurately adjusted sun-dial shows the apparent time, and its difference from the Clock should consequently be equal to the equation of Time.

100. Sidereal Time is that which is measured by the apparent motion of the Fixed Stars, which on account of the earth's perpetually changing its place in its orbit, causes a Star to return to the same meridian in 23h. 56m. 4s.·1, or in 3m. 55s ·9 less than 24 hours of mean time, which is consequently the Acceleration of the Star upon mean time. Portions of which are given for every minute of the day in Table H, of this work, and its uses exemplified in arts. 45 to 55.

101. The Equation of Time as given in this work, is to be applied *as directed* in the columns where it stands to mean time to convert it into apparent or sun time; but the directions are to be reversed when it is required to convert apparent to mean time. See the head of Table B, and also p.p. 18 and 19 of the Appendix.

102. Greenwich Time.—Since all the computations in the Nautical Almanac are made to correspond to the time at that meridian, when certain astronomical observations are taken, it is indispensable to know it *approximately*, in order to take out correctly the quantities therefrom that may be in request.

103. If there be a Chronometer at hand set to Greenwich Mean Time, or its error on that time being known and applied to the time it shows, the result will be, or ought to be the Greenwich Mean Time.

104. If there be no Chronometer at hand, proceed thus; If the time of observation at the ship or place be *before* noon, *i,e.* A.M., *say* at 10h. 15m. 30s. on the 20th of May, *write it down astronomically* 19d. 22h. 15m. 30s.; invariably putting the *day* down (as in the examples) before the hours, minutes, and seconds. If it be *after* noon, *say* 3h. 43m. 15s., P.M., of the same day, write it down 20d. 3h. 43m. 15s., and then *add* thereto the estimated Longitude *in time* (of the ship or place) if it be West, but *subtract* if it be East; and in either case you will have the approximate astronomical Greenwich time accordingly.

105. *Examples.* When it is 10h. 30m. 15s., A. M. at Cape Horn, and also at Cape Comerin, on the 10th of May, what is the corresponding astronomical time at Greenwich?

FOR CAPE HORN.

	D.	H.	M	S.
Given Astro. Time ..	9	22	30	15
Long. 67° 26′ W. = +		4	29	44
Astro. Time at Greenh.	10	2	59	59

FOR CAPE COMERIN.

	D.	H.	M.	S.
....	9	22	30	15
Long. 77° 34′ E. .. = —		5	10	16
Astro. Time at Greenh.	9	17	19	59

106. *Example.*—Required the corresponding Astronomical Greenwich Time at the same places as in Art. 105, at 3h. 46m. 45s., P. M.

AT CAPE HORN.

	D. H. M. S.
Given Time ..	10. 3.46.45
Long. 67°26′ W. = +	4.29.44
Greenwich Time	10. 8.16.29

AT CAPE COMERIN.

	D. H. M. S.
Given Time ..	10. 3.46.45
Long. 77°34′ E. = —	5.10.16
Greenwich Time ..	9.22.36.29

107. The computer in such cases, has only to remember his time-table, namely, 60s. = 1m., 60m. — 1h., and 24h. = 1 day. By attention to the foregoing process he will have no difficulty (as to the proper time) in consulting the Nautical Almanac, in which the things he requires are all put down to correspond with the *Astronomical* Time at the meridian of Greenwich.

108. *The Latitude and Longitude, (by account,) and the observed Altitude of a Fixed Star being given, together with the Rough Time, to find the Apparent and Mean Time at the place of observation.*

Rule.—Correct the observed altitude for index error, dip and refraction, and you will have the true altitude. Take out the Star's declination from Table A. as directed in Art. 1, p. xiii: if it be North, and the co-latitude North also, their sum is the Star's Meridional Altitude; but if one be North and the other South, their difference is the Meridional Altitude. If the sum exceeds 90°, subtract it from 180°. From the natural sine of the Meridional Altitude, subtract the natural sine of the True Altitude, to the logarithm of the remainder add the secant of the Latitude and the secant of the Star's declination; their sum is the log. rising of the Star's distance from the meridian or horary angle (H. A.)

Lessen H. A. with the quantity answering to it in Table H, and if the Star be *West* of the meridian, *add* the reduced H. A. to the corrected culmination, but *subtract* if otherwise, and you will in either case have the Mean Time at the place when the observation was made. *See Arts*, 2, 3, *&c.*

109. *Example.*—April 14th, 1844, about quarter past 5h. A. M., in Latitude 49° 30′ N., Long. 15° W. Admit the Altitude of the Star Arcturus West of the Meridian, corrected for index error, dip, and refraction, to be 28° 4′. Required the Mean Time when the observation was made? and also the Longitude by a Chronometer that showed 6h. 18m. 30s. at Greenwich?

Latitude	49.30 N.	secant		10.18746
Co.-lat.	40.30 N.			
No. 29, Star's dec.....	20. 0 N.	secant		10.02701
Star's Mer. Alt.......	60.30	n. sine ..	87036	
True observed Altitude	28. 4	n. sine ..	47050	
		difference	39986 log.	4.60191

	H. M. S.	
Star's dist. from Mer. H. A.	4.39.19	log. rising 4.81638
Reduction Table H. .... *sub.*	46	In this prob. this is always *sub.*
Reduced hour angle, R. H. A. ..	4.38.33	add to C. C. because Star W.
Cul. 13th April, Tab. B. 12.39.24		
Long. 15° W. Tab. C. .. *sub.*	9=12.39.15	C. C. or corrected culmination
	D.	H. M. S.
Mean Astro. Time	13.17.17.48	= 5.17.48 A. M. the 14th.
Time by Chronometer	13.18.18.30	= 6.18.30
Longitude 15° 10′ 30″ West		= 1. 0.42

For Star East of Meridian, see Art. 50.
And to find C. C. see Arts. 10 to 18.

PRACTICAL DIRECTIONS
FOR KNOWING THE STARS.

These excellent Practical Directions are chiefly extracted from Mr. J. Hosier's "Mariner's Friend," published in 1809.

110. The complaint frequently made by seamen, that it is extremely difficult to find and know the Fixed Stars, does not seem altogether unfounded, if we consider that most if not all the existing treatises on Nautical Astronomy presume a knowledge in the sciences which few seamen have ever an opportunity of attaining. This objection will be obviated by attending to the following directions, in which I have endeavoured to point out simple and practical methods by which the principal Fixed Stars may be found and known by the most unscientific eye; and I am convinced by experience, that a proper degree of attention, and a constant habit of observing the face of the heavens, and the appearances of the celestial bodies, which I cannot too strongly recommend to seafaring men, will soon render them perfectly familiar.

111. The NORTH POLAR STAR, POLARIS, (situated in the tail of the LITTLE BEAR, described hereafter,) is easily distinguished by means of a neighbouring constellation called the GREAT BEAR, which is remarkable for having four stars of the second magnitude, forming what is generally called the square of the Great Bear. If a line* be drawn northward through the two westernmost stars of the square, called the Pointers, it will pass close to the Polar Star, and within one degree of the pole itself. The Polar Star and Dubhe, No. 23, (the north-westernmost Star of the before-mentioned square,) form an equilateral triangle with the easternmost star in the tail of the Great Bear.

112. The GREAT BEAR is a constellation in which are seven remarkable stars; four are of the second magnitude, forming what is called the square; the other three are in the position of an oblique angle, and form the tail. The Great Bear has served to point out the North Pole Star; and as it is a constellation that does not set in our hemisphere, it will serve to direct us to many other of the constellations; for which reason I shall commence with those that never set at London.

113. CASSIOPEIA is a constellation directly opposite to the Great Bear, with respect to the North Star, so that a line drawn from the centre of the Great Bear by the Polar Star, would pass through the middle of Cassiopeia, on the other side the pole. This constellation is formed by seven stars, mos of which are of the second magnitude, in form of a chair reversed.

114. The LITTLE BEAR is a constellation of nearly the same form as the Great Bear; it is parallel to it, but in a reversed situation. The Polar Star, at the extremity of the tail, is of the third magnitude; the four following are smaller, being only of the fourth magnitude; but the two following of the square are of the third magnitude, and are called the guards of the Little Bear; they are on a line drawn perpendicularly from the centre of the square of the Great Bear.

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*When studying the position of the Stars, a piece of small line (to stretch across the line of sight) will be found convenient.

115. Arcturus, No. 29, is the principal star in the constellation Bootes, and one of the first magnitude; it is distant from the tail of the Great Bear, about 31° south-eastward. The two last stars in the tail of the Great Bear form a line, which, continued, passes near to Arcturus.

116. Lyra, No. 38, and Capella, No. 11.—When the constellation of the Great Bear (Dubhe) is on the meridian above the pole, in 51° 30′ N. Latitude, two bright stars of the first magnitude are observable; one bearing N.E. ¼ E. alt. 14°, named Lyra or the bright star in the Harp; the other N. W. by W. alt. 34°, is called Capella, in the left shoulder of the Waggoner. A line drawn westward through the two northernmost stars in the square of the Great Bear, leads directly to Capella.

117. The Dragon (in the head of which is No. 37) is a constellation situated on a line drawn from the northernmost star of the square of the Great Bear by the guards of the Little Bear, between Lyra and the Little Bear, where the four stars in the head form a kind of lozenge, plain to be seen. The tail of the Dragon is situated between the Polar Star and the square of the Great Bear.

118. Orion is a remarkable and splendid constellation, it is seen above the horizon, to the east, about the 15th of January, and continues visible until the latter part of March, when its brilliancy begins to fade in the western sky. It is formed by three stars of the second magnitude, situated close to each other in a right line, and in the centre of a large quadrilateral figure formed by four stars; the north-east Betelguese, No. 14, and south-westernmost, Rigel, No. 12, are stars of the first magnitude.—The three stars in a right line, before described, are called Orion's Belt, and, by their situation, serve to point out the Great Dog star Sirius, No. 16, to the S. E. and the Pleiades, or Seven Stars, to the N. W. These latter are a cluster of small stars in the neck of the constellation of the Bull. A line drawn from Sirius through the middle of Orion's Belt, will pass somewhat to the southward of the Seven Stars and Aldebaran also. To the south of the three stars in Orion's Belt is seen a row of stars called his Sword, and the nebulous stars of Orion.

119. Aldebaran, No. 10, is a bright reddish star of the first magnitude, forming the south eye of the constellation of the Bull. It is situated near the Pleiades, and about 14° S. E. from the latter. This is one of the stars from which the moon's distance is computed in the Nautical Almanac.

120. Procyon, No. 18, or the Little Dog, is a star of the first magnitude, situated north north-east from Sirius, and more easterly than Orion; it forms with Sirius and the belt of Orion nearly an equilateral triangle. The star β canis minoris lying nearly in the same position from Procyon, that Castor does from Pollux, are apt to be mistaken when clouds are passing, but in fair weather cannot be, if their declinations are attended to; the twins being nearly 23° north of Procyon, beside which, Castor and Pollux are of the same magnitude, whereas Procyon and β canis minoris (of the third magnitude), are dissimilar.

121. Castor, No. 17, and Pollux, No. 19, (the constellation of the Twins) are two Stars of the second magnitude, situated near each other in the middle of the space between Orion and the great Bear; the nothernmost of these is Castor, the southernmost Pollux: they are to be distinguished by means of Orion; for a line drawn from Rigel, No. 12, (which is the south-easternmost star of Orion's quadrilateral) by the easternmost star in his Belt,

will pass between Castor and Pollux. Pollux No. 19. is one of the Stars from which the moon's distance is computed in the Nautical Almanac; it is distant about 45° E.N.E. from Aldebaran, No. 10, the S. eye of the Bull. A line drawn from Rigel through the star named Bellatrix, in the western shoulder of Orion, leads nearly to a star of the third magnitude, in the tip of the south horn of the Bull: this star is nearly 14° distant from the star Bellatrix. The star at the tip of the north horn of the Bull is of the second magnitude, situated close to the foot of the Waggoner, on a line drawn from Betelguese, the east shoulder of Orion, and the star in the tip of the southern horn, from which it is distant about 8°. Between the horns of the Bull the ecliptic line passes.

122. The LION is a constellation formed by a large trapezium, wherein is observed a star of the first magnitude named Regulus, No. 22, or the Lion's Heart; which is one of the stars from which the moon's distance is computed in the Nautical Almanac. This constellation forms in the shape of a reaper's hook, having Regulus in the end of the handle to the south, and the back of the hook to the Eastward. A line drawn from Rigel in Orion, through Procyon in the Little Dog, will lead a little to the Northward of Regulus, which is about 37° from Procyon to the east north east, and about the same distance E.S.E. half E. from the star Pollux. A line drawn from the North Pole Star through its pointers, passes about 12° to the eastward of Regulus. In the tail of the Lion is a star β Leonis, No. 24, of the second magnitude, situated about 2° to the southward of a line drawn from Regulus to Arcturus, and about 24° from Regulus to the east by north, and 35° from Arcturus to the W.B.S. and forms nearly an equilateral triangle with Arcturus, No. 29, and the bright star, No. 26, in the heel of the Virgin, which forms the southern angle of the triangle.

123. CANCER, or the CRAB, is a constellation formed of many small stars, somewhat difficult to distinguish: the nebulæ of Cancer are a cluster of stars less visible than the Pleiades; they are situated on a line drawn from the middle of the Twins by Regulus, or on a line drawn from Procyon to the tail of the Great Bear.

124. The RAM, (ARIES,) which is the first of the 12 signs of the Zodiac, is formed principally of two stars; one of the second, the other of the third magnitude. This constellation is pointed out by a line drawn from Procyon to Aldebaran; which, continued, leads to the southward of the star Arietes, No. 6, which is about 23° to the W. of the Pleiades having the star β in the same constellation 3½° to the S. W. of it, and is one of the stars from which the moon's distance is computed in the Nautical Almanac.

125. PERSEUS.—The middle of this constellation is formed by three stars, one of which is of the second magnitude; they form the segment of a circle turned towards the Great Bear. A line drawn from Castor, No. 17, to α Persei, No. 9, passes immediately over Capella, No. 11, from which star, α Persei, is situated W. N. W. 19°. A line drawn from the N. Polar Star to the Pleiades, passes through the middle of Perseus; a line drawn from the Belt of Orion by Aldebaran, passes through the head of Medusa, which Perseus holds in his hand, in which is a star of the second magnitude, named Algol:—this star is not always of the same brilliancy.

126. The SWAN is a remarkable constellation, that assumes nearly the form of a large cross, in which is a bright star of the second magnitude, Deneb, No. 41, It is E. N. E. 24° from Lyra, No. 38, and N. N. E. 39° from Aquila, No. 39.

127. The square of **Pegasus** is formed by four stars of the second magnitude; the northernmost star in the N. E. angle of the square is in the head of Andromeda, Alpheratz, No. 1. A line drawn from the Belt of Orion through the star Arietis in the Ram, leads to the bright star in the head of Andromeda. A line drawn from the Pleiades by the S. side of the star Arietis, No. 6, leads to the star Algenib, No. 2, in the extremity of the wing, which is one of the four stars that form the S. E. angle of the square; the other two are to the westward: the northernmost one is called Scheat, in the N. W. angle, and the southernmost one Markab or Pegasi, No. 43, in the S. W. angle of the square; the latter is one of the stars from which the moon's distance is computed in the Nautical Almanac: it bears about E. by N. 48° from the star in the Eagle called Aquilæ, and W. ½ S. 44° from the star Arietis in the head of the Ram. A line drawn through that diagonal of Pegasus formed by the stars Algenib and Scheat, to the north-westward, leads to the bright star in the tail of the Swan, No. 41. Another diagonal line, from Markab through the head of Andromeda, towards the N. E. passes near the bright star in the centre of Andromeda, and also near the star at the foot of Andromeda, both of the second magnitude; dividing into three equal parts the space comprehended between the head of Andromeda and the centre of Perseus. They are nearly in a line between the constellation of the Ram and Cassiopeia.

128. The constellations which appear in the summer evenings have not so many remarkable stars to distinguish them as those that appear in winter; but they may be known by the following directions:—About the end of May, towards nine o'clock in the evening, when the middle star in the tail of the Great Bear is on the meridian, above the pole at London, the bright star in the heel of the Virgin, named Spica, No. 26, is seen on the meridian to the southward, with about 28° of altitude. This is a star of the first magnitude, and one from which the moon's distance is computed in the Nautical Almanac. It is situated at about 54° E.S.E. from Regulus, or the Lion's Heart, with no bright star near it, and forms nearly an equilateral triangle with Arcturus, No. 29, in Bootes, and the bright star in the tail of the Lion, called Deneb, No. 24; from the last of which it is distant about 35°. At the same time are seen, about 16° south-westward of Spica, a figure in shape nearly a trapezium formed by the four principal stars in the constellation of the Crow; a line drawn from Lyra, No. 38, the bright star in the Harp, through Spica, leads directly to them.

129. **Hydra.** A line drawn from the two stars in the square of the Great Bear nearest the tail by Regulus, leads to a star of the second magnitude called Alphard, No. 21, or the Heart of Hydra, at about 23° to the S. of Regulus: the head of Hydra is a little to the S. of Cancer, or the Crab, between the stars Procyon, No. 18, and Regulus, No. 22, and about 3° S. of a line drawn between those two stars; the Hydra extends from the constellation of the Crab to the S. of Libra.

130. **Crater**, or the **Cup**.—This constellation is situated between the Crow and Hydra.

131. **Lyra**, No. 38, the bright star in the Harp, is of the first magnitude, and one of the most brilliant in the heavens; it forms nearly a right-angled triangle with Arcturus, No. 29, in Bootes and the North Pole Star, the right angle being to the eastward next Lyra. This star is seen to just touch the horizon when on the meridian below the pole, and is therefore one of those stars that never set in the latitude of London, and may be mistaken in and about the British Channel for the light of a light-house. *See Art.* 152.

132. **Corona Borealis**, or **Northern Crown**, No. 32, is a small constellation near to Arcturus, on a line drawn from Arcturus to Lyra. It is readily distinguished by seven stars that appear in the form of a semicircle; one of these is of the second magnitude.

133. **Aquila**, No. 39, or the **Eagle**, is a constellation that contains a bright star of the second magnitude, named Altair. Altair is situated about 34° S. by E. from Lyra, No. 38, and 48° W. by S. from the star Pegasi, No. 43, the south-westernmost of the square of Pegasus. Altair, (called in this volume Aquila,) is readily distinguished, being the centre of three stars, forming a right line in the direction of N. N. W. and S.S.E.; the stars on each side are of the third magnitude, and distant from Altair about 2° or 3°. This star is paler than Antares, mentioned hereafter.

134. **Scorpio** and **Antares**, No. 34,—A great circle, or a line passing eastward by Regulus and Spica, near the ecliptic, passes through the constellation Scorpio, in which is a star of the first magnitude, named Antares. It is situated about 46° E.S.E. from Spica, with about 26° of south declination. It is a remarkable star, of a reddish colour. On each side of it, to the W.N.W. and S.S.E. about 2° distant, is a star of the third or fourth magnitude, forming an obtuse angle with it, no bright star being near. This constellation, which is not distinctly seen in England, resembles the reptile after which it takes its name.

135. **Libra**, No. 31.—In the constellation Libra are two stars of the second magnitude, one in each scale: the one in the northern scale is nearly in a line drawn from Arcturus in Bootes to Antares in the Scorpion: the southern scale is between Spica and Antares, the three being near the ecliptic; Spica at the distance of 21° from the southern scale to the west, and Antares about E. by S. 25° distant from the same.

136. **Sagittarius** is the constellation next to Libra, eastward, in the ecliptic, on a line continued eastward from Spica through Antares. Sagittarius contains many stars of the third magnitude, forming a figure resembling a large trapezium. This constellation is situated on a line drawn from the centre of the Swan through the middle of the Eagle, at about 35° to the S. of the Eagle. The Swan is about the same distance from the Eagle to the north.

137. **Ophiucus** and **Hercules**.—A line drawn from Antares northward to the Polar Star, crosses the constellations Ophiucus, or the Serpent-Bearer, and Hercules. The stars in these constellations being difficult to distinguish, I shall endeavour to show how they may be traced.—A line drawn from Antares to Lyra, passes through the head of the Serpent-Bearer, near to which is that of Hercules: in each is a star of the second magnitude, situated in a line pointing towards the Northern Crown: the one that is most to the southward and eastward is in the head of the Serpent-Bearer, and is called Ophiuci, No. 36, that to the northward and westward is called Hercules.

138. **Capricornus** is a constellation situated in the ecliptic, on a line drawn from Lyra, No. 38, through the Eagle. In this constellation are two stars of the third magnitude, situated on the before-mentioned line.

139. **Fomalhaut**, No. 43, in the mouth of Piscis Australis, or the Southern Fish, is a star of the first magnitude, and one from which the moon's distance is computed in the Nautical Almanac. It is situated about 60° S.E. from Aquilæ, and 45° S. a little west from Pegasi. It is a bright star of high

southern declination, its altitude in northern latitudes being small, never exceeding 20° in the latitude of 40°.

140. The **Dolphin** is a small constellation, situated about 15° to the E. of the Eagle, formed by a lozenge of four stars of the third magnitude.

141. The constellation **Aquarius**, one of the signs of the Zodiac, is distinguished by a line drawn from the bright star Lyra through the Dolphin. A line drawn from the Dolphin to Fomalhaut, No. 43, in the mouth of the Southern Fish, passes between two stars of the third magnitude in the shoulders of Aquarius. These two stars are the most remarkable in this constellation.

142. **Cetus**, or the **Whale**, is a large constellation situated to the S. of Aries, or the Ram, in a space between the Pleiades and the square of Pegasus. A line drawn from Pollux, No. 19, through Aldebaran, leads to a star in the chaps of the Whale, Menkar, No. 8, at about 24° south-easterly from the horns of the Ram: this is a star of the second magnitude. A line drawn from Aldebaran through the before-mentioned star, leads to a star of the second magnitude in the tail.

143. **Pisces**, or the **Fishes**, is the twelfth sign of the Zodiac. It is composed of stars the least remarkable of any in the heavens: one of them is situated to the south of the square of Pegasus; the other is situated more northerly and easterly, between the head of Andromeda and that of the Whale. The star in the knot of the line that unites the two fishes is of the third magnitude, and is the most remarkable of the constellation; it is situated in a line drawn from the foot of Andromeda by the head of the Whale: it is about 40° W. of Aldebaran, on a line drawn from the foot of the Twins by Aldebaran, No. 10.

144. **Lepus**, or the **Hare**, is a constellation at the foot of Orion. Columba, or the Dove, is to the S. of the Hare. The Centaur is a constellation to the S. of the Virgin, nearly on a line with the horizon. Lupus, or the Wolf, is S. of the Scorpion. The Ship Argo, to the S. of Hydra. Antinous, to the S. of the Eagle. Equuleus, or the Little Horse, between the Dolphin, Aquarius, and Pegasus. The Great and Little Triangle, with Musca Borealis, or the Northern Fly, are in the centre between a star of the second magnitude in Andromeda, and the Pleiades. Eridanus, or the River, is between Rigel in the foot of Orion, and the Whale. Cor Caroli, or Charles's Heart, to the S. of the tail of the Great Bear. Coma Berenices, or Berenices' Hair, between the Great Bear and the Lion. The Lynx, between the Twins, the Great Bear, and the Waggoner. Taurus Poniatowski, between Aquila and Ophiucus. The Unicorn, to the S. of Procyon, between Orion and Hydra. Leo Minor, to the N. of the Lion. The Sextant, to the S. of the Lion. Lacerta, or the Lizard, between the Swan and Andromeda. The Rein-Deer in Messier, and the Camelopardalus between the Great Bear and Cassiopeia. Canes Venatici, or the Greyhounds, between the tail of the Great Bear and Bootes. Vulpes and Anser, or the Fox and Goose, and Sagitta, or the Arrow, to the S. of Lyra and the Swan, or N. of the Eagle and Dolphin.

ON THE CELESTIAL GLOBE.

145. Persons who can conveniently add a Celestial Globe to their stock of nautical instruments, and have also room in their cabin to stow it, will find it a valuable appendage. A brief description of the instrument, and a few of the necessary problems will not, it is hoped, be unacceptable here. First, with regard to its size, a twelve-inch globe would be desirable, but should this from circumstances be considered too large, a nine-inch globe will be found very useful; and in combination with the Star Tables extremely simple to rectify.

146. *Description.*—The globe revolves upon its axis, which passes through both its poles and centres in a flat brass ring called the brazen meridian, which circumscribes the globe, and is supported in a wooden frame, having a brass rest in the centre and bottom of the frame. This rest has a brass screw to confine the brazen meridian at pleasure. Two grooves are cut in the north and south portions of the horizon, which suffering the brazen meridian to pass through them, support the globe in any required position. The wooden frame consists of either three or four pillars which serve as feet, and also support a broad flat circle of wood which circumscribes the globe, and is called the horizon, dividing the globe into the upper and lower hemispheres.

The brazen meridian is graduated on one side, and is divided into 4 times 90 degrees beginning at the equator on both sides, and ending with 90 at the two poles. There are also two small hour circles of brass divided into twice 12 hours, and fitted on the meridian round the poles which carry an index pointing to the hour. The upper surface of the horizon is also graduated, and divided into 4 times 90 degrees, beginning from the north and south points of the horizon, and ending in the east and west; this is done in two circles, the one being the complement of the other. The points of the mariners' compass are also marked on the horizon; there is also a thin slip of brass, called a quadrant of altitude, made to fit on occasionally upon the brass meridian at the heighest or vertical point to measure the altitude of any thing above the horizon. On the surface of the globe itself, the principal great circles are the equinoctial, the ecliptic, and the two colures. The two first of these are divided into 360 degrees, beginning at the first point of Aries. The degrees marked on the equinoctial line serve to shew the right ascension of any celestial object. Those marked on the brazen meridian point out its declination, being the same with latitude in geography, or distance from the equator.

147. *Problem.*—To rectify the globe in north latitude, elevate the north pole far above the north point of the horizon as is equal to the latitude of the ship or place, by sliding the brass meridian in its groove. In south latitude, elevate the south pole above the south point of the horizon in the same manner, and secure the globe in this position by means of the screw in the rest. This operation is indispensable in all the following operations.

148. The globe being now rectified to the latitude, seek any convenient star of the first magnitude in Table B, in the column which corresponds to the required day. For *Example.*—The 1st of January, 1844, in latitude 50° N., required the position of the principal fixed stars at 6h. P. M.? Having elevated the north pole 50° above the horizon, secure it in this position by the screw in the brass rest at the bottom of the frame. On reference to the first column in Table B, it is seen that the bright star *a* Aquila, No. 39. culminates at 1h. 2m.

P. M.;* now turn the globe until this star comes under the graduated edge of the brass meridian, and set the index of the hour circle to 1h. 2m., and the globe with its pole pointing to the pole of the world, by means of the mariner's compass, allowing for the variation; now turn the globe from 1h. 2m westward, until the index points to 6h. P.M. the given time. The globe will then represent the face of the heavens, and in a clear night each star on the globe will correspond with the real star in the heavens, and its true bearing will be pointed out on the wooden horizon by the compass points marked thereon. Thus Capella is seen E. N. E. ½ N. about 38° high; the belt of Orion rising to the east; Aldebaran, No. 10, east 24° high; Castor, No. 17, and Pollux, No. 19, above the horizon to the N.E.; Dubhe, No. 23, nearly on the meridian below the north pole; Lyra, No. 38, W. N. W. about 37° high; and Corona Borealis setting to the N. W.

A case in South Latitude.

149. *Example.*—Being off the Cape of Good Hope, and steering E.S.E. ½ S. by compass, in latitude by account 36° S. on the 10th of May, 1844, in the evening twilight about 5h. 35m., seeing a bright star half a point on the larboard bow, whose altitude is 24°, What star is this, and in what direction are the other principal stars, above the horizon?

Operation.—Elevate the south pole 36° above the horizon, and direct it to the south pole of the heavens,† which is consequently on the starboard beam, the variation of the compass being 2½ points westerly.

Find the passage of any star, say Sirius, which by Table B. passes at 3h. 24m. 12s. P. M., and turn the globe until the star comes under the graduated edge of the brass meridian, and set the index of the hour-circle accordingly.

Turn the globe round westward until it indicates the given time‖ (5h. 35m.) then will the stars upon the globe correspond with the stars in the heavens. The star on the larboard bow is therefore found to be Spica, No. 26, bearing E. S. E. by compass, and the constellation of Orion is on the larboard quarter; the star Rigel, No. 12, is the southernmost large star in this constellation, having at this time 33° altitude, and bearing N.W. ¼ W. by compass. Sirius, No. 16, is about a point more to the northward, 55° high, and in the same azimuth or vertical circle with the belt of Orion; below which, and a little more to the northward, is Aldebaran, No. 10, 9° high; Procyon, No. 18, nearly north by compass about 44° altitude; Castor, No. 17, and Pollux, No. 19, N. B. E, about 20°; Regulus, No. 22, N. E. ½ E. 38°; Canopus, No. 15, W. B. S. ½ S. 60°; the eye of the Peacock, No. 40, S. S. W. 3½°; the stars in the Cross, S. B. E. 48° high; the eastern foot of the Centaur, No. 30, S. ¾ E. 33°; and Acherner, No. 5, W. S. W. ½ S. 21°.

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* *Caution.*—The hours on the hour-circle of a globe begin at noon and end at 12 o'Clock, or midnight, and then recommence and end at noon agreeably to *civil* reckoning; but the hours in Table B. commence at noon, and continue to 24 hours or the following noon, agreeably to *astronomical* time; therefore in taking out the culmination from Table B, if the hours be less than 12h. it is so much time past noon on the day in question; but where the hours exceed 12h. it is so much time past midnight, and the index to the hour-circle must be adjusted accordingly. Thus on the 1st of January, 1844, Regulus, No. 22, culminates at 15h. 16m. 33s. which is 3h. 16m. 33s. past the second 12 or midnight, on the hour-circle, which is equal to 3h. 16m. 33s. on the morning of the 2nd of January, by civil reckoning.

† It is always advisable to direct the pole of the globe to its corresponding pole in the heavens.

‖ A small wooden wedge will be found convenient to put in between the horizon and the globe to prevent it from revolving after it is rectified.

150. *Problem.—To find the declination and right ascension of any Star upon the globe :—*

Turn the globe till the star comes to the meridian, then the number of degrees on the meridian between the equator and the star, is its declination; and the degree of the equator cut by the meridian, is the right ascension of the star. In like manner are found by the declination and right ascension of the sun or any other celestial object, their places upon the globe.

151. *Problem. To find the time of the rising or setting of any fixed star.*

Rectify the globe as by Art. 148,—9, seek the time of the star's culmination in Table B, and set the index of the hour-circle accordingly: turn the globe, and bring the star to the eastern side of the horizon; the index of the hour-circle will now point to the time of the star's rising; again, turn the globe till the star comes to the western side of the horizon, when the index will point to the *time* of the star's setting.

152. The utility of the foregoing problem is of more importance to mariners than some are aware of. There is scarcely an experienced seaman that has not himself mistaken, or seen others mistake, a bright star in the horizon for the light of a light-house, or floating light, when he has been expecting to see the light; and there is no doubt that such mistakes have been the occasion of the loss of many ships and more valuable lives. The star *a* Lyra, during several months of the year in the British Channel is subject to be mistaken when below the pole. On the 1st of January, for example, this star will skirt the horizon from N. b. W. ¾ W. to N. b. W. ¼ W. *true bearing*, in the latitude of 49° 30′ N. from about 10h. P. M. to 10h. 30m. P. M. when it will disappear, and rise again and skirt the horizon from N. b. E. ¼ E. to N. b. E. ¾ E. *true bearing*, and from about 44m. past midnight till 14m. past one, when the star will be too high to mistake. Now, a ship coming into the channel, and in consequence of thick weather, not having seen the land, and being by estimation the length of the Eddystone, might, by the opening of the clouds, for a few minutes in that quarter, easily mistake this star, which is perhaps then only seen at short intervals, on account of passing squalls, that would occasionally obscure it, or the light at the light-house also. Indeed, in fair weather such a mistake is not unlikely to take place, for the star showing a steady light for a time is easily mistaken, and perhaps the sky is afterwards suddenly overcast, and a departure has been obtained by the bearing of the *star* instead of the *light*, and the consequences possibly fatal to ship and crew!

There is not a night in the year in which such a mistake might not happen with some bright star or other, in several points of the compass, and in the vicinity of light-houses; and if the celestial globe where of no other utility than for this alone, it would appear a sufficient reason for every navigator that has charge of a ship to avail himself of the possession of it, and also of a sufficient knowledge of its uses, to avoid the consequences herein described.

153. *Given the observed Altitudes of any two known Stars at the same instant, to find the Latitude by the Globe, approximately.*

Rule. Reduce the observed to the true altitudes, subtract them from 90°, and you will have the zenith distance of each star. From the equinoctial, with a pair of compasses (having a black-lead pencil in one leg) take the extent of each star's zenith distance, and from their centres, respectively, describe arcs on the globe: these arcs will meet in the *zenith*, and as the distance from the zenith (of all places) to the equinoctial is always equal to the latitude, the zenith being brought under the graduated edge of the brazen meridian, the degrees thereon, reckoned from the equinoctial, will show the latitude accordingly.

By means of this problem the latitude may also be had in the day-time, by taking altitudes of the sun and moon at the same instant, or by the sun and the planet Venus (which the author has repeatedly done at sea); and by a chronometer, noting the times of such altitudes, find the place of the sun and moon or of Venus, and prick them off accurately on the globe accordingly; then computing the *true* altitudes, find the place of the zenith, as directed in this article: the nearest distance from which to the equinoctial, is the latitude.

154. If the observer has the option of choosing the stars for determining the latitude by article 153, such stars as may be situated above 45° and under 80° are to be preferred, for if the zenith distance be more than 45° there is more probability of incorrectness in the measure thereof on the globe, unless it be a very perfect one; again, if the star be too high, its altitude is not so easily obtained; but this in a great measure depends on the observer, who, if he has no other assistant, may easily obtain the altitudes of both stars at the same instant, by observing the altitude of one star first, and by noting the elapsed time by a watch to the taking of the other star, then using the same interval to obtain another altitude by the first star, and consequently needing no proportion.

155. The last problem, if managed carefully in practice, upon a well-made globe, and on which the stars are correctly laid down, is susceptible of considerable accuracy in approximating the latitude; and in the event of a ship's being for several days without celestial observations for the latitude, if the altitudes of any two known stars can be thus obtained, it may often be attended with great advantages. It will, at all events, afford a material part of the *data* necessary for a double altitude, that may probably be obtainable by the same or other stars, or by the sun shortly after, and which agreeing with each other in result, may be considered as the true latitude. The operation is so simple, that with two observers it will not occupy more than five minutes altogether, and in a fine night it may be repeated by the same or different stars at pleasure, and a mean of the whole taken for the latitude.

156. *Example.*—In North Latitude, let the observed altitude of *a* Lyra be 38° 59′, and at the same instant that of *a* Aquila be 34° 14′ both west of the meridian, the eye 16 feet above the surface of the sea, and both quadrants adjusted: required the latitude at the time of observation?

	a Lyra	*a Aquila*
Observed Altitudes	38°59′	34°14′
Dip and Ref.	— 5	— 5
True Altitudes	38.54	34. 9
Zenith Distances	51. 6	55.51

Operation.—With the extent 51° 6′ taken from the equinoctial, and with one foot of the compasses in *a* Lyra, describe that arc towards the zenith.

Again, with the extent 55° 51′, and one foot of the compasses in *a* Aquila describe another arc, intersecting the former, the point of intersection is the zenith of the place in which the altitudes were taken, which being brought under the graduated edge of the brazen meridian, and reckoned from the equinoctial, will show the latitude, or what may be still better, viz., measured by the compasses to the nearest part of the equinoctial, and the extent referred thereto, shows 42° 0′ the latitude. The time of the observation may be readily found by bringing either star under the graduated edge of the brass meridian, and fixing the index or hour circle to the time of the star's passing the meridian (given in Table B. for every day in the year), then turning the globe round until the intersected point, already found, be under the graduated edge of the brazen meridian, the index will show the approximate time that the altitudes were observed accordingly.

*A convenient makeshift Transit Instrument for examining the Rates of Chronometers.**

157. An eye-piece, with three vertical wires, and one cross wire, may be easily fitted at a trifling expense, and applied to a common ship telescope, which being placed securely, in or near the meridian, where it is not subject to be disturbed, answers the purpose of examining the going of Chronometers perfectly. Persons with a little ingenuity will easily accomplish the fixing of the makeshift transit; the following method, however, is suggested as simple and practicable.

158. Prepare two iron or brass hooks, such as are used to place the glass in, when it is not wanted: or, if preferred, two wooden cleats hollowed out to receive the glass.—Screw one (the outermost), of these hooks or cleats into the frame of any convenient window, but the nearer to the north or south the better, according as the latitude of the place be south or north; and have the other hook and screws ready to fix, when any convenient star may be passing; and having directed the telescope towards the star, so that it will pass through the centre of the field of the telescope, fix the other hook or cleat, and lash the instrument securely in this position. The operation of fixing, will most likely prevent an observation the first night, of that star by which the instrument is fixed, but if properly managed, future observations will be the more satisfactorily made; and indeed the chances are much in favor of other stars passing through the field of the telescope, that by successful watching for, will be additionally serviceable.

159. Care should be taken not to select a star too near the pole, say not within 20° of it; and since the apparent motion of a star is quickest in the equinoctial, the nearer the star is to that great circle, the better. It is almost unnecessary to observe, that the altitude of the equinoctial above the horizon, is always equal to the complement of the latitude, and that the altitude of the elevated pole, is equal to the latitude itself: due regard to these circumstances, will readily point out the most convenient elevation for the telescope.

To observe the Transit of a Star over the Wires of the Telescope.

160. A few minutes before the time of the star's passage, having the chronometer at hand, seat yourself to the telescope, and carefully observe the time of the contact of the star with each wire: should the wires be sufficiently large to obscure the star entirely, its *disappearance* behind the wires, is perhaps the best instant to observe.

161. Take the mean of the times of the three observations for the meridian passage of the star, and repeat the operation every night, or as occasion may require, and allow for each night 3m. 55s. and nine-tenths, for the accelleration of *any fixed star*. Thus,

	M. S.		M. S.
For 1 night	3.55·9	For 3 nights	11.47·7
For 2 nights	7.51·8	For 4 nights	15.43·6

and so on, by Table G. Whatever the chronometer differs from this acceleration, such difference is its error on *mean time* accordingly.

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* Mr. Dollond, of St. Paul's Churchyard, has recently supplied the author with a telescope thus fitted, having a reflecting cap to fit on at the outer end, to show the wires by the reflected light of a candle: which completely answers the intended purpose.

162. By this means the author has examined the rate of several chronometers in India; having only one wire, or rather a single hair fixed in the telescope, with a little bamboo hoop, at such a distance from the eye, as to be a distinct object when the telescope was adjusted for observation, but a system of wires properly fitted is certainly preferable.

163. The advantage however of a proper transit instrument over a makeshift one is manifest; for if the former be placed properly in the meridian, every star whose true apparent place is known, will agree respectively with each other in determining the time and error of the Chronometer.

164. The quantity of time elapsed between the transit of any star from one wire to another being observed in the equinoctial, the time that any other star whose declination is known, will occupy between the transit of the same wires, may be easily computed in the following manner:

Example. – The wires of a transit instrument for an equitorial star, subtend 24 seconds; what should they subtend, when observing the transit of α Lyra?

α Lyra's dec. 38° 38′ cos.	9.8927
Pro. log. 24s. taken as minutes	0.8751
Rejecting 10 in the index	0.7678

= 30′ 43″ = 30″ ·7 the answer.

This would have come out the same, if the pro. log. for 24s. had been taken out, but the answer in such cases, is more readily valued by using minutes for seconds.

165. The utility of the foregoing example will be obvious, when it is considered that from the interposition of clouds or other impediment, if the transit of an object, whose declination is known, over any one wire is obtained, the transit over the centre wire may be easily computed.

166. It may so happen that a convenient window cannot be found for fixing the makeshift telescope nearly in the meridian: should this be the case, and there be a window between the cardinal points of the horizon, it will be proper then to give the wires an inclination at right angles with the apparent motion of the star, having the middle wire to pass through the centre of a circle, conceived to be formed by the motion of the star above the horizon, which may be sufficiently approximated, by duly considering that portion of the circle contained between its meridian altitude and amplitude.

167. If attention be not paid to the directions contained in article 166, the stars will pass along the wires so slowly, that the transit will be imperfectly observed.

168. This method of examining the performance of chronometers on shore is far preferable to altitudes of the sun or stars, the effect of refraction being perfectly immaterial in the first, but a considerable impediment to precision in the latter; exclusively of the liability to errors of instruments, &c.

169. Any liquid substance that, in a state of rest, has the property of reflecting objects distinctly, will answer the purpose of an artificial horizon. If it be a transparent substance, the interior of the vessel that is employed to

contain it, is improved by being blackened: but a basin of water will often suffice, as well as the most expensive instrument. The most common liquids made use of, are water, water mixed with wheaten flour, or quicksilver; the latter, as being less susceptible of the effect of wind, is perhaps to be preferred, This inconvenience, however, is remedied by having a glazed roof or penthouse, placed over the liquid to protect it. Artificial horizons are sometimes fitted with a plate of glass, the surfaces of which are ground parallel to each other as they can be, and floating upon the quicksilver, make a valuable instrument for ascertaining the altitudes of celestial objects on shore, and consequently a means of obtaining the time and latitude of the place of observation, provided the double altitude of the object does not exceed the extent of the graduated arc of the sextant. When a floating glass is made use of, it is indispensable, to insure accuracy, to take the mean of two altitudes, which ought to be observed with the glass diametrically opposite to its position, when the first altitude was taken; and thus to do away the errors that arise from want of parallelism in the two surfaces of the floating glass, which Mr. E. Troughton informed the author was extremely difficult to obviate.

170. Various experiments have been made to accomplish the *very desirable* means of taking the altitudes of celestial objects at sea, when the horizon itself cannot be perceived. Any one who may discover such means, will do an essential service to mariners.

In foggy weather it often happens, and particularly in the neighbourhood of the British Isles, that the sun is shining in all its splendour upon a ship's deck, when the fog is so thick upon the surface of the sea, as entirely to prevent the sight of any object being seen upon it, more than 100 yards from the ship. In this case, the artificial horizon, if it could be used, would be invaluable; but the tremulous motion of the ship entirely precludes the use of any one of the construction already alluded to.

On taking and Correcting Altitudes with the Artificial Horizon.

171. The method of taking the altitude of the sun by the artificial horizon, is, to bring the lower limb of the image reflected by the sextant, to touch the (apparently) upper limb reflected by the artificial horizon. This is, in fact, bringing the lower limb of the sun to touch its own image in the horizon: for the latter is an inverted object, but the former, by double reflection, is represented as it appears to the eye in the concave surface of the heavens. Therefore the corrections of the altitude so observed are these, viz:

172. First apply the index error to the angle read off from the instrument; next divide the angle by 2, and you will have the observed altitude of the sun's lower limb, from which subtract the refraction answering thereto; and lastly add the semidiameter and parallax, and you will have the true altitude of the sun's centre.

173. If the reflected images of the sun be brought into one, or to cover each other, a method preferred by some observers, the correction for the semidiameter is then consequently to be ommitted, and the other corrections applied, as directed in art. 172.

Example (by Art. 172.)

174. July 1.—Let the angle, measured by a sextant, that has 45″ subtractive error, between the apparently nearest limbs of the two reflected images

of the sun, seen in the artificial horizon, be 84° 15′ 40″, the barometer 30 inches, and the thermometer 50°: Required the true altitude of the sun's centre?

Observed angle between the apparently nearest limbs	84.15.40
Index error	— 45
	2)84.14.55
Observed altitude sun's l. l.	42. 7.27
Refraction Table XIV.	1. 5
(a)	42. 6.22
Sun's semidiameter	+ 16. 0
Tab. XXXIII.	— 15
Parallax Table XII.	+ 7
True alt. sun's centre............	42.22.14

The quantity marked *(a)* increased by 7″, the parallax, would have been the true altitude, had the observation been taken as described in art. 173.

STAR TABLES.

N. B. This problem is added, in case of any two stars being observed that are not in Dr. Brinkly's tables. For angle of comparison, see Art. 90.

75. ***Problem.*** ***Given the right ascensions and declinations of two fixed stars; to find their true distance.***

Rule.—Call the polar distance of the star farthest from the elevated pole F, the polar distance of the other star N, and the difference of their right ascensions diff. R. A. Add together the log. sine of F, the log. sine of N, and double the log. sine of half diff. R. A; from half their sum *(a)* subtract the log. sine of half the difference of F. and N, seek the log. tangent and its corresponding log. sine, subtract the latter from *(a)*, the remainder is half the sum of the true distance which being doubled gives the true distance.

Example.—What is the distance between Sirius and β Argus?

	H. M. S.		° ′ ″		
R. A. Sirius	6. 38. 16	.. Declination ..	16.30.24 S.		
β Argus	9. 11. 31		69. 4.39 S.		
Diff. R. A.	2. 33. 15				
	9.981722	.. log. sine ..	73.29.36	=	F. *p. d.*
	9.552792	.. log. sine ..	20.55.21	=	N. *p. d.*
½ Diff. R. A.	19.032042	double log. sine of	1h. 16m. 37s.=19°9′15″		
Sum	2)38.566556				
½ sum $\mathcal{A}$	19.283278	diff. F. and N.	52.34.15		
Sine	9.646250	½ diff.	26.17. 7½		
Tan.	9.637028		23.26.19		
Sine	9.599622		23.26.19		
Sine	9.683656	½ true distance	28.51.37		
			2		
		True distance	57.43.14		

TABLE A. Catalogue of 45 principal FIXED STARS, with their Right Ascensions and Declinations &c., for the year 1844.

No. of the Star.	NAMES AND SITUATIONS OF THE STARS.	Character.	Magnitude.	Right Ascensions.	Annual Varia-tions.	Declinations.	Annual Varia-tions.
				H. M. S.	s. +	° ′ ″	″
1	The head of Andromedæ *Alpheratz*....	α	1	0. 0.20·09	3·07	28.13.45N	+20·05
2	Extremity of the wing of Pegasus, *Algenib*	γ	2.3	0. 5.12·52	3·08	14.18.57N	+20·05
3	Bright star in the tail of the Whale	β	2.3	0.35.45·31	3·00	18.50.39S	—19·81
4	In the girdle of Andromedæ *Mirach*....	β	2	1. 0.59·40	3·30	34.47.37N	+19·41
0	North Pole Star, *Polaris*	α	2.3	1. 3.17·97	16·92	88.28.40N	+19·29
5	In the spring of the river Erida, *Achernar*	α	1	1.31.53·82	2·23	58. 1.51S	—18·46
6	†In the following horn of the Ram, *Arietis*	α	3	1.58.23·48	3·35	22.43.19N	+17·44
7	In the neck of the Whale, *Mira*	ο	2	2.11.27·50	3·01	3.41.21S	—16·56
8	In the jaw of the Whale, *Menkar*	α	2.3	2.54. 7·84	3·13	3.28.26N	+14·54
9	The bright star in Perseus	α	2.3	3.13.12·89	4·23	49.18. 1N	+13·34
10	†The south eye of the Bull, *Aldebaran*..	α	1	4.26.58·58	3·43	16.11.26N	+ 7·92
11	In the left shoulder of Auriga, *Capella*..	α	1	5. 5.10·51	4·41	45.49.57N	+ 4·75
12	In the bright foot of Orion, *Rigel*	β	1	5. 7. 2.60	2·88	8.23.11S	— 4·59
13	In the northern horn of the Bull	β	2	5.16.26·14	3·78	28.28.10N	+ 3·79
14	In the east shoulder of Orion, *Betelguese*	α	1	5.46.43·69	3·24	7.22.20N	+ 1·16
15	In the poop of the ship Argo, *Canopus*..	α	1	6.20.29·49	1·33	52.36.46S	+ 1·79
16	In the mouth of the greater Dog, *Sirius*..	α	1	6.38.16·53	2·65	16.30.24S	+ 4·48
17	In the head of the northern Twin, *Castor*	α2	2	7.24.38·40	3·86	32.13.27N	— 7·24
18	In the lesser Dog, *Procyon*	α	1.2	7.31. 7·93	3·14	5.37.12N	— 8·75
19	†In the head of the southern Twin, *Pollux*	β	2	7.35.45·78	3·68	28.23.51N	— 8·14
20	In the oars of the ship Argo	β	1	9.11.31·62	0·74	69. 4.39S	+14·84
21	In the head of the female Hydra, *Alphard*	α	2	9.19.55·27	2·95	7.59. 6S	+15·36
22	†In the Lion's heart, *Regulus*	α	1	10. 0. 3·65	3·22	12.43.38N	—17·37
23	The nearest pointer to the Pole Star, *Dubhe*	α	1.2	10.54. 3·12	3·80	62.35.30N	—19·23
24	In the Lion's tail, *Denebola*	β	2.3	11.41. 5·92	3·07	15.26.38N	—19·99
25	In the foot of the Cross	α	1	12.17.58·38	3·27	62.14. 0S	+19·99
26	†The Virgin's spike, *Spica*	α	1	13.16.58·91	3·15	10.20.43S	+18·93
27	The last star in the tail of the great Bear	η	2	13.41.23·13	2·35	50. 5.36N	—18·12
28	The western foot of the Centaur........	β	1	13.52.52·50	4·15	59.36.59S	+17·67
29	The bright star in Bootes, *Arcturus*	α	1	14. 8.32·90	2·73	19,59.50N	—18·94
30	In the eastern foot of the Centaur	α2	1	14.29. 3·90	4·01	60.11. 7S	+15·12
31	In the northern scale of Libra	β	2.3	15. 8.37·17	3·22	8.48.11S	+13·64
32	Bright star in the Crown, *Cor. Bor.*....	α	2	15.28. 5·03	2·53	27.14.36N	—12·34
33	In the neck of the Serpent	α	2.3	15.36.35·21	2·94	6.55.14N	—11·75
34	†In the Scorpion's heart, *Antares*	α	1	16.19.51·08	3·66	26. 4.47S	+ 8·49
35	In the head of Hercules	α	3.4	17. 7.32·20	2·73	14.34.21N	— 4·55
36	In the head of Ophiuchus	α	2	17.27.41·68	2·77	12.40.43N	— 2·82
37	In the head of the Dragon	γ	2	17.52.59·15	1·39	51.30.34N	— 0·61
38	The bright star in the Harp, *Lyra*......	α	1	18.31.39·31	2·01	38.38.29N	+ 2·76
39	†The bright star in the Eagle, *Aquila* ..	α	1.2	19.43.10·29	2·93	8.27.36N	+ 8·73
40	In the eye of the Peacock	α	2	20.13.16·20	4·81	57.13.42S	—11·02
41	In the tail of the Swan, *Deneb*	α	2	20.36. 6·89	2·04	44.43.32N	+12·63
42	In the western wing of the Crane	α	2	21.58.22·21	3·81	47.42.47S	—17·30
43	†In the mouth of the south. fish, *Fomalhaut*	α	1	22.49. 0·93	3·31	30.26.50S	—19·10
44	†In the wing of Pegasus, *Pegasi*	α	2	22.56.59·64	2·98	14.22. 1N	+19·30

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

A number is prefixed to each Star as a convenient reference.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JANUARY, 1844.

Day.	1	2	3	4	5	6	7	8
Eqn. of Time.	3m. 35s. sub.	4m. 3s. sub.	4m. 31s. sub.	4m. 59s. sub.	5m. 26s. sub.	5m. 53s. sub.	6m. 19s. sub.	6m. 45s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	5.18.28	5.14.32	5.10.36	5. 6.40	5. 2.44	4.58.49	4.54.53	4.50.57
2	5.23.20	5.19.24	5.15.28	5.11.32	5. 7.36	5. 3.40	4.59.44	4.55.48
3	5.53.47	5.49.52	5.45.56	5.42. 0	5.38. 4	5.34. 8	5.30.12	5.26.16
4	6.18.57	6.15. 2	6.11. 6	6. 7.10	6. 3.14	5.59.18	5.55.22	5.51.26
*5	6.49.47	6.45.51	6.41.55	6.37.59	6.34. 3	6.30. 7	6.26.11	6.22.16
6†	7.16.12	7.12.16	7. 8.20	7. 4.24	7. 0.29	6.56.33	6.52.37	6.48.41
7	7.29.14	7.25.18	7.21.22	7.17.26	7.13.30	7. 9.35	7. 5.39	7. 1.43
8	8.11.47	8. 7.52	8. 3.56	8. 0. 0	7.56. 4	7.52. 8	7.48.12	7.44.16
9	8.30.49	8.26.53	8.22.58	8.19. 2	8.15. 6	8.11.10	8. 7.14	8. 3.18
*10†	9.44.23	9.40.27	9.36.31	9.32.35	9.28.39	9.24.43	9.20.48	9.16.52
*11	10.22.29	10.18.33	10.14.37	10.10.41	10. 6.45	10. 2.49	9.58.53	9.54.57
*12	10.24.20	10.20.24	10.16.29	10.12.33	10. 8.37	10. 4.41	10. 0.45	9.56.49
13	10.33.42	10.29.46	10.25.51	10.21.55	10.17.59	10.14. 3	10.10. 7	10. 6.11
*14	11. 3.55	10.59.59	10.56. 3	10.52. 7	10.48.11	10.44.15	10.40.20	10.36.24
*15	11.37.35	11.33.39	11.29.43	11.25 47	11.21.52	11.17.56	11.14. 0	11.10. 4
*16	11.55.19	11.51.23	11.47.28	11.43.32	11.39.36	11.35.40	11.31.44	11.27.48
17	12.41.34	12.37.38	12.33.42	12.29.46	12.25.50	12.21.54	12.17.58	12.14. 2
*18	12.48. 2	12 44. 6	12.40.10	12.36.14	12.32.19	12.28.23	12.24.27	12.20.31
19†	12.52.39	12.48.43	12.44.47	12.40.52	12.36.56	12.33. 0	12.29. 4	12.25. 8
*20	14.28. 9	14.24.13	14.20.18	14.16.22	14.12.26	14. 8.30	14. 4.34	14. 0.38
21	14.36.32	14.32.36	14.28.40	14.24.44	14.20.48	14.16.52	14.12.56	14. 9. 0
*22†	15.16.33	15.12.38	15. 8.42	15. 4.46	15. 0.50	14.56.54	14.52.58	14.49. 2
*23	16.10.24	16. 6.28	16. 2.32	15.58.36	15.54.40	15.50.45	15.46.49	15.42.53
24	16.57.19	16.53.23	16.49.27	16.45.31	16.41.36	16.37.40	16.33.44	16.29.48
*25	17.34. 6	17.30.10	17.26.14	17.22.18	17.18.22	17.14.26	17.10.30	17. 6.34
*26†	18.32.56	18.29. 1	18.25. 5	18.21. 9	18.17.13	18.13.17	18. 9.21	18. 5.25
27	18.57.17	18.53.21	18.49.25	18.45.29	18.41.33	18.37.37	18.33.41	18.29.45
*28	19. 8.44	19. 4 48	19. 0.52	18.56.56	18.53. 1	18.49. 5	18.45. 9	18.41.13
*29	19.24.22	19.20.26	19.16.30	19.12.34	19. 8.38	19. 4.42	19. 0.47	18.56.51
*30	19.44.50	19.40.54	19 36.58	19.33. 2	19.29. 6	19.25.10	19.21.14	19.17.18
31	20.24.16	20.20.20	20.16·25	20.12.29	20. 8.33	20. 4.37	20. 0.41	19.56.45
32	20.43.41	20.39.45	20.35.49	20.31.53	20.27.57	20.24. 2	20.20. 6	20.16.10
33	20.52.10	20.48.14	20.44.18	20.40.22	20.36.26	20.32.30	20.28.34	20.24.39
*34†	21.35.19	21.31.23	21.27.27	21.23.31	21.19.35	21.15.39	21.11.43	21. 7.47
35	22.22.52	22.18.56	22.15. 0	22.11. 4	22. 7. 8	22. 3.12	21.59.17	21.55.21
36	22.42.58	22.39. 2	22.35. 6	22.31.10	22.27.15	22.23.19	22.19.23	22.15.27
37	23. 8.11	23. 4.16	23. 0.20	22.56.24	22.52.28	22 48.32	22.44.36	22.40.40
*38	23.46.45	23.42.49	23.38.53	23.34.58	23.31. 2	23.27. 6	23.23.10	23.19.14
*39†	1. 2. 0	0.58. 5	0.54. 9	0.50.13	0.46.17	0.42.21	0.38.25	0.34.29
40	1.32. 1	1.28. 6	1.24.10	1.20.14	1.16.18	1.12.22	1. 8.26	1. 4.30
*41	1.54 48	1.50.52	1.46.57	1.43. 1	1.39. 5	1.35. 9	1.31.13	1.27.17
42	3.16.50	3.12.54	3. 8.58	3. 5. 3	3. 1. 7	2.57.11	2.53.15	2.49.19
*43†	4. 7.21	4. 3.25	3.59.29	3.55.33	3.51.37	3.47.41	3.43.45	3.39.49
44†	4.15.18	4.11.22	4. 7.26	4. 3.30	3.59.34	3.55.39	3.51.43	3.47.47

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JANUARY, 1844.

Day.	9	10	11	12	13	14
Eqn. of Time.	7m. 11s. sub.	7m. 36s. sub.	8m. 0s. sub.	8m. 24s. sub.	8m. 47s. sub.	9m.9s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	4.47. 1	4.43. 5	4.39. 9	4.35.13	4.31.17	4.27.21
2	4.51.53	4.47.57	4.44. 1	4.40. 5	4.36. 9	4.32.13
3	5.22.20	5.18.24	5.14.28	5.10.33	5. 6.37	5. 2.41
4	5.47.30	5.43.34	5.39.38	5.35.43	5.31.47	5.27.51
*5	6.18.20	6.14.24	6.10.28	6. 6.32	6. 2.36	5.58.40
6†	6.44.45	6.40.49	6.36.53	6.32.57	6.29. 1	6.25. 5
7	6.57.47	6.53.51	6.49.55	6.45.59	6.42. 3	6.38. 7
8	7.40.20	7.36.24	7.32.28	7.28.32	7.24.37	7.20.41
9	7.59.22	7.55.26	7.51.30	7.47.34	7.43.38	7.39.43
*10†	9.12.56	9. 9. 0	9. 5. 4	9. 1. 8	8.57.12	8.53.16
*11	9.51. 1	9.47. 5	9.43. 9	9.39.14	9.35.18	9.31.22
*12	9.52.53	9.48.57	9.45. 1	9.41. 5	9.37. 9	9.33.14
13	10. 2.15	9.58.19	9.54.23	9.50.27	9.46.31	9.42.36
*14	10.32.28	10.28.32	10.24.36	10.20.40	10.16.44	10.12.48
*15	11. 6. 8	11. 2.12	10.58.16	10.54.20	10.50.24	10.46.28
*16	11.23.52	11.19.56	11.16. 0	11.12. 4	11. 8. 8	11. 4.13
17	12.10. 6	12. 6.11	12. 2.15	11.58.19	11.54.23	11.50.27
*18	12.16.35	12.12.39	12. 8.43	12. 4.47	12. 0.51	11.56.55
19†	12.21.12	12.17.16	12.13.20	12. 9.24	12. 5.28	12. 1.32
*20	13.56.42	13.52.46	13.48.50	13.44.54	13.40.58	13.37. 3
21	14. 5. 4	14. 1. 9	13.57.13	13.53.17	13.49.21	13.45.25
*22†	14.45. 6	14.41.10	14.37.14	14.33.18	14.29.23	14.25.27
*23	15.38.57	15.35. 1	15.31. 5	15.27. 9	15.23.13	15.19.17
24	16.25.52	16.21.56	16.18. 0	16.14. 4	16.10. 8	16. 6.12
*25	17. 2.38	16.58.42	16.54.46	16.50.51	16.46.55	16.42.59
*26†	18. 1.29	17.57.33	17.53.37	17.49.41	17.45.46	17.41.50
27	18.25.49	18.21.54	18.17.58	18.14. 2	18.10. 6	18. 6.10
*28	18.37.17	18.33.21	18.29.25	18.25.29	18.21.33	18.17.37
*29	18.52.55	18.48.59	18.45. 3	18.41. 7	18.37.11	18.33.15
*30	19.13.22	19. 9.27	19. 5.31	19. 1.35	18.57.39	18.53.43
31	19.52.49	19.48.53	19.44.57	19.41. 1	19.37. 5	19.33.10
32	20.12.14	20. 8.18	20. 4.22	20. 0.26	19.56.30	19.52.34
33	20.20.43	20.16.47	20.12.51	20. 8.55	20. 4.59	20. 1. 3
*34†	21. 3.51	20.59.56	20.56. 0	20.52. 4	20.48. 8	20.44.12
35	21.51.25	21.47.29	21.43.33	21.39.37	21.35.41	21.31.45
36	22.11.31	22. 7.35	22. 3.39	21.59.43	21.55.47	21.51.51
37	22.36.44	22.32.48	22.28.52	22.24.56	22.21. 1	22.17. 5
*38	23.15.18	23.11.22	23. 7.26	23. 3.30	22.59.34	22.55.38
*39†	0.30.33	0.26.37	0.22.41	0.18.45	0.14.50	0.10.54
40	1. 0.34	0.56.38	0.52.42	0.48.46	0.44.51	0.40.55
*41	1.23.21	1.19.25	1.15.29	1.11.33	1. 7.37	1. 3.42
42	2.45.23	2.41.27	2.37.31	2.33.35	2.29.39	2.25.43
*43†	3.35.53	3.31.58	3.28. 2	3.24. 6	3.20.10	3.16.14
44†	3.43.51	3.39.55	3.35.59	3.32. 3	3.28. 7	3.24.11

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 9	0.48
16	0.12	1. 4
20	0.15	1.20
24	0.18	1.36
28	0.20	1.52
32	0.23	2. 8
36	0.26	2.24
40	0.29	2.40
44	0.32	2.56
48	0.35	3.12
52	0.38	3.28
56	0.41	3.44
60	0.44	4. 0
64	0.47	4.16
68	0.50	4.32
72	0.52	4.48
76	0.55	5. 4
80	0.58	5.20
84	1. 1	5.36
88	1. 4	5.52
92	1. 7	6. 8
96	1.10	6.24
100	1.13	6.40
104	1.16	6.56
108	1.19	7.12
112	1.22	7.28
116	1.25	7.44
120	1.28	8 0
124	1.30	8.16
128	1.33	8.32
132	1.36	8.48
136	1.39	9. 4
140	1.42	9.20
144	1.45	9.36
148	1.48	9.52
152	1.51	10. 8
156	1.54	10.24
160	1.57	10.40
164	1.59	10.56
168	2. 2	11.12
172	2. 5	11.28
176	2. 8	11.44
180	2.11	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JANUARY, 1844.

Day.	15	16	17	18	19	20	21	22
Eqn. of Time.	9m. 31s. sub.	9m. 52s. sub.	10m. 13s. sub.	10m. 33s. sub.	10m. 52s. sub.	11m. 10s. sub.	11m. 28s. sub.	11m. 45s. sub.
Star	H. M. S	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	4.23.25	4.19.30	4.15.34	4.11.38	4. 7.42	4. 3.46	3.59.50	3.55.54
2	4.28.17	4.24.21	4.20.25	4.16.29	4.12.33	4. 8.38	4. 4.42	4. 0.46
3	4.58.45	4.54.49	4.50.53	4.46.57	4.43. 1	4.39. 5	4.35. 9	4.31.14
4	5.23.55	5.19.59	5.16. 3	5.12. 7	5. 8.11	5. 4.15	5. 0.19	4.56.24
*5	5.54.44	5.50.48	5.46.52	5.42.56	5.39. 1	5.35. 5	5.31. 9	5.27.13
6†	6.21. 9	6.17.14	6.13.18	6. 9.22	6. 5.26	6. 1.30	5.57.34	5.53.38
7	6.34.11	6.30.15	6.26.20	6.22.24	6.18.28	6.14.32	6.10.36	6. 6.40
8	7.16.45	7.12.49	7. 8.53	7. 4.57	7. 1. 1	6.57. 5	6.53. 9	6.49.13
9	7.35.47	7.31.51	7.27.55	7.23.59	7.20. 3	7.16. 7	7.12.11	7. 8.15
*10†	8.49.20	8.45.24	8.41.28	8.37.33	8.33.37	8.29.41	8.25.45	8.21.49
*11	9.27.26	9.23.30	9.19.34	9.15.38	9.11.42	9. 7.46	9. 3.50	8.59.55
*12	9.29.18	9.25.22	9.21.26	9.17.30	9.13.34	9. 9.38	9. 5.42	9. 1.46
13	9.38.40	9.34.44	9.30.48	9.26.52	9.22.56	9.19. 0	9.15. 4	9.11. 8
*14	10. 8.52	10. 4.56	10. 1. 0	9.57. 5	9.53. 9	9.49.13	9.45.17	9.41.21
*15	10.42.32	10.38.37	10.34.41	10.30.45	10.26.49	10.22.53	10.18.57	10.15. 1
*16	11. 0.17	10.56.21	10.52.25	10.48.29	10.44.33	10.40.37	10.36.41	10.32.45
17	11.46.31	11.42.35	11.38.39	11.34.43	11.30.47	11.26.51	11.22.56	11.19. 0
*18	11.52.59	11.49. 4	11.45. 8	11.41.12	11.37.16	11.33.20	11.29.24	11.25.28
19†	11.57.37	11.53.41	11.49.45	11.45.49	11.41.53	11.37.57	11.34. 1	11.30. 5
*20	13.33. 7	13.29.11	13.25.15	13.21.19	13.17.23	13.13.27	13. 9.31	13. 5.35
21	13.41.29	13.37.33	13.33.37	13.29.41	13.25.45	13.21.49	13.17.54	13.13.58
*22†	14.21.31	14.17.35	14.13.39	14. 9.43	14. 5.47	14. 1.51	13.57.55	13.53.59
*23	15.15.21	15.11.25	15. 7.30	15. 3.34	14.59.38	14.55.42	14.51.46	14.47.50
24	16. 2.16	15.58.21	15.54.25	15.50.29	15.46.33	15.42.37	15.38.41	15.34·45
*25	16.39. 3	16.35. 7	16.31.11	16.27.15	16.23.19	16.19.23	16.15.27	16.11.32
*26†	17.37.54	17.33.58	17.30. 2	17.26. 6	17.22.10	17.18.14	17.14.18	17.10.22
27	18. 2.14	17.58.18	17.54.22	17.50.26	17.46.30	17.42.34	17.38.39	17.34.43
*28	18.13.41	18. 9.46	18. 5.50	18. 1.54	17.57.58	17.54. 2	17.50. 6	17.46.10
*29	18.29.19	18.25.23	18.21.27	18.17.32	18.13.36	18. 9.40	18. 5.44	18. 1.48
*30	18.49.47	18.45.51	18.41.55	18.37.59	18.34. 3	18.30. 7	18.26.12	18.22.16
31	19.29.14	19.25.18	19.21.22	19.17.26	19.13.30	19. 9.34	19. 5.38	19. 1.42
32	19.48.38	19.44.42	19.40.47	19.36.51	19.32.55	19.28.59	19.25. 3	19.21. 7
33	19.57. 7	19.53.11	19.49.15	19.45.19	19.41.24	19.37.28	19.33.32	19.29.36
*34†	20.40.16	20.36.20	20.32.24	20.28.28	20.24.32	20.20.36	20.16.41	20.12.45
35	21.27.49	21.23.53	21.19 57	21.16. 2	21.12. 6	21. 8.10	21. 4.14	21. 0.18
36	21.47.55	21.44. 0	21.40. 4	21.36. 8	21.32.12	21.28.16	21.24.20	21.20.24
37	22.13. 9	22. 9.13	22. 5.17	22. 1.21	21.57.25	21.53.29	21.49.33	21.45.37
*38	22.51.43	22.47.47	22.43.51	22.39.55	22.35.59	22.32. 3	22.28. 7	22.24.11
*39†	0. 6.58	0. 3. 2 23. 59. 6	23.55.10	23.51.14	23.47.18	23.43.22	23.39.26	23.35.31
40	0.36.59	0.33. 3	0.29. 7	0.25.11	0.21.15	0.17.19	0.13.23	0. 9.27
*41	0.59.46	0.55.50	0.51.54	0.47.58	0.44. 2	0.40. 6	0.36.10	0.32.14
42	2.21.48	2.17.52	2.13.56	2.10. 0	2. 6. 4	2. 2. 8	1.58.12	1.54.16
*43†	3.12.18	3. 8.22	3. 4.26	3. 0.30	2.56.34	2.52.38	2.48.43	2.44.47
44†	3.20.15	3 16.19	3.12.24	3. 8.28	3. 4.32	3. 0.36	2.56.40	2.52.44

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JANUARY, 1844.

Day.	23	24	25	26	27	28
Eqn. of Time.	12m. 1s. sub.	12m. 17s. sub.	12m. 31s. sub.	12m. 45s. sub.	12m. 58s. sub.	13m. 10s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	3.51.58	3.48. 2	3.44. 6	3.40.11	3.36.15	3.32.19
2	3.56.50	3.52.54	3.48.58	3.45. 2	3.41. 6	3.37.10
3	4.27.18	4.23.22	4.19.26	4.15.30	4.11.34	4. 7.38
4	4.52.28	4.48.32	4.44.36	4.40.40	4.36.44	4.32.48
*5	5.23.17	5.19.21	5.15.25	5.11.29	5. 7.33	5. 3.37
6†	5.49.42	5.45.46	5.41.50	5.37.55	5.33.59	5.30. 3
7	6. 2.44	5.58.48	5.54.52	5.50.56	5.47. 1	5.43. 5
8	6.45.18	6.41.22	6.37.26	6.33.30	6.29.34	6.25.38
9	7. 4.19	7. 0.24	6.56.28	6.52.32	6.48.36	6.44.40
*10†	8.17.53	8.13.57	8.10. 1	8. 6. 5	8. 2. 9	7.58.14
*11	8.55.59	8.52. 3	8.48. 7	8.44.11	8.40.15	8.36.19
*12	8.57.50	8.53.55	8.49.59	8.46. 3	8.42. 7	8.38.11
13	9. 7.12	9. 3.17	8.59.21	8.55.25	8.51.29	8.47.33
*14	9.37.25	9.33.29	9.29.33	9.25.37	9.21.41	9.17.46
*15	10.11. 5	10. 7. 9	10. 3.13	9.59.18	9.55.22	9.51.26
*16	10.28.49	10.24.54	10.20.58	10.17. 2	10.13. 6	10. 9.10
17	11.15. 4	11.11. 8	11. 7.12	11. 3.16	10.59.20	10.55.24
*18	11.21.32	11.17.36	11.13.40	11. 9.45	11. 5.49	11. 1.53
19†	11.26. 9	11.22.13	11.18.18	11.14.22	11.10.26	11. 6.30
*20	13. 1.39	12.57.44	12.53.48	12.49.52	12.45.56	12.42. 0
21	13.10. 2	13. 6. 6	13. 2.10	12.58.14	12.54.18	12.50.22
*22†	13.50. 4	13.46. 8	13.42.12	13.38.16	13.34.20	13.30.24
*23	14.43.54	14.39.58	14.36. 2	14.32. 6	14.28.11	14.24.15
24	15.30.49	15.26.53	15.22.57	15.19. 2	15.15. 6	15.11.10
*25	16. 7.36	16. 3.40	15.59.44	15.55.48	15.51.52	15.47.56
*26†	17. 6.27	17. 2.31	16.58.35	16.54.39	16.50.43	16.46.47
27	17.30.47	17.26.51	17.22.55	17.18.59	17.15. 3	17.11. 7
*28	17.42.14	17.38.18	17.34.22	17.30.27	17.26.31	17.22.35
*29	17.57.52	17.53.56	17.50. 0	17.46. 4	17.42. 8	17.38.13
*30	18.18.20	18.14.24	18.10.28	18. 6.32	18. 2.36	17.58.40
31	18.57.46	18.53.51	18.49.55	18.45.59	18.42. 3	18.38. 7
32	19.17.11	19.13.15	19. 9.19	19. 5.23	19. 1.28	18.57.32
33	19.25.40	19.21.44	19.17.48	19.13.52	19. 9.56	19. 6. 0
*34†	20. 8.49	20. 4.53	20. 0.57	19.57. 1	19.53. 5	19.49. 9
35	20.56.22	20.52.26	20.48.30	20.44.34	20.40.38	20.36.43
36	21.16.28	21.12.32	21. 8.36	21. 4.41	21. 0.45	20.56.49
37	21.41.42	21.37.46	21.33.50	21.29.54	21.25.58	21.22. 2
*38	22.20.15	22.16.19	22.12.24	22. 8.28	22. 4.32	22. 0.36
*39†	23.31.35	23.27.39	23.23.43	23.19.47	23.15.51	23.11.55
40	0. 5.32	0. 1. 36 23. 57.40	23.53.44	23.49.48	23.45.52	23.41.56
*41	0.28.18	0.24.23	0.20.27	0.16.31	0.12.35	0. 8.39
42	1.50.20	1.46.24	1.42.29	1.38.33	1.34.37	1.30.41
*43†	2.40.51	2.36.55	2.32.59	2.29. 3	2.25. 7	2.21.11
44†	2.48.48	2.44.52	2.40.56	2.37. 0	2.33. 5	2.29. 9

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 9	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.17	1.36
28	0.20	1.52
32	0.23	2. 8
36	0.25	2.24
40	0.28	2.40
44	0.31	2.56
48	0.34	3.12
52	0.37	3.28
56	0.39	3.44
60	0.42	4. 0
64	0.45	4.16
68	0.48	4.32
72	0.51	4.48
76	0.53	5. 4
80	0.56	5.20
84	0.59	5.36
88	1. 2	5.52
92	1. 5	6. 8
96	1. 8	6.24
100	1.10	6.40
104	1.13	6.56
108	1.16	7.12
112	1.19	7.28
116	1.22	7.44
120	1.25	8. 0
124	1.27	8.16
128	1.30	8.32
132	1.33	8.48
136	1.36	9. 4
140	1.39	9.20
144	1.41	9.36
148	1.44	9.52
152	1.47	10. 8
156	1.50	10.24
160	1.53	10.40
164	1.55	10.56
168	1.58	11.12
172	2. 1	11.28
176	2. 4	11.44
180	2. 7	12. 0

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JANUARY. 1844. FEBRUARY.

Day.	29	30	31	1	2	3	4	5
Eqn. of Time.	13m. 21s. sub.	13m. 32s. sub.	13m. 41s. sub.	13m. 50s. sub.	13m. 58s. sub.	14m. 5s. sub.	14m. 11s. sub.	14m. 16s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	3.28.23	3.24.27	3.20.31	3.16.35	3.12.39	3. 8.43	3. 4.48	3. 0.52
2	3.33.14	3.29.19	3.25.23	3.21.27	3.17.31	3.13.35	3. 9.39	3. 5.43
3	4. 3.42	3.59.46	3.55.50	3.51.55	3.47.59	3.44. 3	3.40. 7	3.36.11
4	4.28.52	4.24.56	4.21. 0	4.17. 5	4.13. 9	4. 9.13	4. 5.17	4. 1.21
*5	4.59.42	4.55.46	4.51.50	4.47.54	4.43.58	4.40. 2	4.36. 6	4.32.10
6†	5.26. 7	5.22.11	5.18.15	5.14.19	5.10.23	5. 6.27	5. 2.32	4.58.36
7	5.39. 9	5.35.13	5.31.17	5.27.21	5.23.25	5.19.29	5.15.33	5.11.38
8	6.21.42	6.17.46	6.13.50	6. 9.55	6. 5.59	6. 2. 3	5.58. 7	5.54.11
9	6.40.44	6.36.48	6.32.52	6.28.56	6.25. 1	6.21. 5	6.17. 9	6.13.13
*10†	7.54.18	7.50.22	7.46.26	7.42.30	7.38.34	7.34.38	7.30.42	7.26.46
*11	8.32.23	8.28.27	8.24.31	8.20.36	8.16.40	8.12.44	8. 8.48	8. 4.52
*12	8.34.15	8.30.19	8.26.23	8.22.27	8.18.32	8.14.36	8.10.40	8. 6.44
13	8.43.37	8.39.41	8.35.45	8.31.49	8.27.54	8.23.58	8.20. 2	8.16. 6
*14	9.13.50	9. 9.54	9. 5.58	9. 2. 2	8.58. 6	8.54.10	8.50.14	8.46.18
*15	9.47.30	9.43.34	9.39.38	9.35.42	9.31.46	9.27.50	9.23.55	9.19.59
*16	10. 5.14	10. 1.18	9.57.22	9.53.26	9.49.31	9.45.35	9.41.39	9.37.43
17	10.51.28	10.47.32	10.43.37	10.39.41	10.35.45	10.31.49	10.27.53	10.23.57
*18	10.57.57	10.54. 1	10.50. 5	10.46. 9	10.42.13	10.38.17	10.34.22	10.30.26
19†	11. 2.34	10.58.38	10.54.42	10.50.46	10.46.50	10.42.55	10.38.59	10.35. 3
*20	12.38. 4	12.34. 8	12.30.12	12.26.16	12.22.21	12.18.25	12.14.29	12.10.33
21	12.46.26	12.42.30	12.38.35	12.34.39	12.30.43	12.26.47	12.22.51	12.18.55
*22†	13.26.28	13.22.32	13.18.36	13.14.41	13.10.45	13. 6.49	13. 2.53	12.58.57
*23	14.20.19	14.16.23	14.12.27	14. 8.31	14. 4.35	14. 0.39	13.56.43	13.52.48
24	15. 7.14	15. 3.18	14.59.22	14.55.26	14.51.30	14.47.34	14.43.39	14.39.43
*25	15.44. 0	15.40. 4	15.36. 8	15.32.13	15.28.17	15.24.21	15.20.25	15.16.29
*26†	16.42.51	16.38.55	16.34.59	16.31. 4	16.27. 8	16.23.12	16.19.16	16.15.20
27	17. 7.11	17. 3.15	16.59.20	16.55.24	16.51.28	16 47.32	16.43.36	16.39.40
*28	17.18.39	17.14.43	17.10.47	17. 6.51	17. 2.55	16.58.59	16.55. 4	16.51. 8
*29	17.34.17	17.30.21	17.26.25	17.22.29	17.18.33	17.14.37	17.10.41	17. 6.45
*30	17.54.44	17.50.48	17.46.53	17.42.57	17.39. 1	17.35. 5	17.31. 9	17.27.13
31	18.34.11	18.30.15	18.26.19	18.22.23	18.18.28	18.14.32	18.10.36	18. 6.40
32	18.53.36	18.49.40	18.45.44	18.41.48	18.37.52	18.33.56	18.30. 0	18.26. 5
33	19. 2. 5	18.58. 9	18.54.13	18.50.17	18.46.21	18.42.25	18.38.29	18.34.33
*34†	19.45.13	19.41.17	19.37.22	19.33.26	19.29.30	19.25.34	19.21.38	19.17.42
35	20.32.47	20.28.51	20.24.55	20.20.59	20.17. 3	20.13. 7	20. 9.11	20. 5.15
36	20.52.53	20.48.57	20.45. 1	20.41. 5	20.37. 9	20.33.13	20.29.18	20.25.22
37	21.18. 6	21.14.10	21.10.14	21. 6.19	21. 2.23	20.58.27	20.54.31	20.50.35
*38	21.56.40	21.52.44	21.48.48	21.44.52	21.40.56	20.37. 1	21.33. 5	21.29. 9
*39†	23. 7.59	23. 4. 3	23. 0. 7	22.56.12	22.52.16	22.48.20	22.44.24	22.40.28
40	23.38. 0	23.34. 4	23.30. 8	23.26.13	23.22.17	23.18.21	23.14.25	23.10.29
*41	0. 4.43	0. 0. 47 23. 56. 51	23.52.55	23.49. 0	23.45. 4	23.41. 8	23.37.12	23.33.16
42	1.26.45	1.22.49	1.18.53	1.14.57	1.11. 1	1. 7. 6	1. 3.10	0.59.14
*43†	2.17.15	2.13.19	2. 9.24	2. 5.28	2. 1.32	1.57.36	1.53.40	1.49.44
44†	2.25.13	2.21.17	2.17.21	2.13.25	2. 9.29	2. 5.33	2. 1.37	1.57.42

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

FEBRUARY, 1844.

Day.	6	7	8	9	10	11
Eqn. of Time.	14m. 21s. sub.	14m. 25s. sub.	14m. 28s. sub.	14m. 30s. sub.	14m. 31s. sub.	14m. 32s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	2.56.56	2.53. 0	2.49. 4	2.45. 8	2.41.12	2.37.16
2	3. 1.47	2.57.51	2.53.56	2.50. 0	2.46. 4	2.42. 8
3	3.32.15	3.28.19	3.24.23	3.20.27	3.16.32	3.12.36
4	3.57.25	3.53.29	3.49.33	3.45.37	3.41.42	3.37.46
*5	4.28.14	4.24.19	4.20.23	4.16.27	4.12.31	4. 8.35
6†	4.54.40	4.50.44	4.46.48	4.42.52	4.38.56	4.35. 0
7	5. 7.42	5. 3.46	4.59.50	4.55.54	4.51.58	4.48. 2
8	5.50.15	5.46.19	5.42.23	5.38.27	5.34.31	5.30.36
9	6. 9.17	6. 5.21	6. 1.25	5.57.29	5.53.33	5.49.37
*10†	7.22.51	7.18.55	7.14.59	7.11. 3	7. 7. 7	7. 3.11
*11	8. 0.56	7.57. 0	7.53. 4	7.49. 8	7.45.13	7.41.17
*12	8. 2.48	7.58.52	7.54.56	7.51. 0	7.47. 4	7.43. 8
13	8.12.10	8. 8.14	8. 4.18	8. 0.22	7.56.26	7.52.30
*14	8.42.23	8.38.27	8.34.31	8.30.35	8.26.39	8.22.43
*15	9.16. 3	9.12. 7	9. 8.11	9. 4.15	9. 0.19	8.56.23
*16	9.33.47	9.29.51	9.25.55	9.21.59	9.18. 3	9.14. 7
17	10.20. 1	10.16. 5	10.12. 9	10. 8.14	10. 4.18	10. 0.22
*18	10.26.30	10.22.34	10.18.38	10.14.42	10.10.46	10. 6.50
19†	10.31. 7	10.27.11	10.23.15	10.19.19	10.15.23	10.11.27
*20	12. 6.37	12. 2.41	11.58.45	11.54.49	11.50.53	11.46.57
21	12.14.59	12.11. 3	12. 7. 7	12. 3.12	11.59.16	11.55.20
*22†	12.55. 1	12.51. 5	12.47. 9	12.43.13	12.39.17	12.35.22
*23	13.48.52	13.44.56	13.41. 0	13.37. 4	13.33. 8	13.29.12
24	14.35.47	14.31.51	14.27.55	14.23.59	14.20. 3	14.16. 7
*25	15.12.33	15. 8.37	15. 4.41	15. 0.45	14.56.50	14.52.54
*26†	16.11.24	16. 7.28	16. 3.32	15.59.36	15.55.40	15.51.45
27	16.35.44	16.31.48	16.27.52	16.23.57	16.20. 1	16.16. 5
*28	16.47.12	16.43.16	16.39.20	16.35.24	16.31.28	16.27.32
*29	17. 2.50	16.58.54	16.54.58	16.51. 2	16.47. 6	16.43.10
*30	17.23.17	17.19.21	17.15.25	17.11.30	17. 7.34	17. 3.38
31	18. 2.44	17.58.48	17.54.52	17.50.56	17.47. 0	17.43. 4
32	18.22. 9	18.18.13	18.14.17	18.10.21	18. 6.25	18. 2.29
33	18.30.37	18.26.42	18.22.46	18.18.50	18.14.54	18.10.58
*34†	19.13.46	19. 9.50	19. 5.54	19. 1.59	18.58. 3	18.54. 7
35	20. 1.20	19.57.24	19.53.28	19.49.32	19.45.36	19.41.40
36	20.21.26	20.17.30	20.13.34	20. 9.38	20. 5.42	20. 1.46
37	20.46.39	20.42.43	20.38.47	20.34.51	20.30.55	20.27. 0
*38	21.25.13	21.21.17	21.17.21	21.13.25	21. 9.29	21. 5.33
*39†	22.36.32	22.32.36	22.28.40	22.24.44	22.20.49	22.16.53
40	23. 6.33	23. 2.37	22.58.41	22.54.45	22.50.50	22.46.54
*41	23.29.20	23.25.24	23.21.28	23.17.32	23.13.36	23. 9.41
42	0.55.18	0.51.22	0.47.26	0.43.30	0.39.34	0.35.38
*43†	1.45.48	1.41.52	1.37.56	1.34. 1	1.30. 5	1.26. 9
44†	1.53.46	1.49.50	1.45.54	1.41.58	1.38. 2	1.34. 6

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.13	1.20
24	0.16	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.24	2.24
40	0.27	2.40
44	0.30	2,56
48	0.32	3.12
52	0.35	3.28
56	0.38	3.44
60	0.40	4. 0
64	0.43	4.16
68	0.46	4.32
72	0.48	4.48
76	0.51	5. 4
80	0.54	5.20
84	0.57	5.36
88	0.59	5.52
92	1. 2	6. 8
96	1. 5	6.24
100	1. 7	6.40
104	1.10	6.56
108	1.13	7.12
112	1.15	7.28
116	1.18	7.44
120	1.21	8 0
124	1.23	8.16
128	1.26	8.32
132	1.29	8.48
136	1.31	9. 4
140	1.34	9.20
144	1.37	9.36
148	1.40	9.52
152	1.42	10. 8
156	1.45	10.24
160	1.48	10.40
164	1.50	10.56
168	1.53	11.12
172	1.56	11.28
176	1.58	11.44
180	2. 1	12. 0

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

FEBRUARY, 1844.

Day.	12	13	14	15	16	17	18	19
Eqn. of Time.	14m. 32s. sub.	14m. 31s. sub.	14m. 30s. sub.	14m. 27s. sub.	14m. 24s. sub.	14m. 21s. sub.	14m. 16s. sub.	14m. 11s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	2.33.20	2.29.24	2.25.29	2.21.33	2.17.37	2.13.41	2. 9.45	2. 5.49
2	2.38.12	2.34.16	2.30.20	2.26.24	2.22.28	2.18.32	2.14.37	2.10.41
3	3. 8.40	3. 4.44	3. 0.48	2.56.52	2.52.56	2.49. 0	2.45. 4	2.41. 8
4	3.33.50	3.29.54	3.25.58	3.22. 2	3.18. 6	3.14.10	3.10.14	3. 6.18
*5	4. 4.39	4. 0.43	3.56.47	3.52.51	3.48.55	3.45. 0	3.41. 4	3.37. 8
6†	4.31. 4	4.27. 8	4.23.13	4.19.17	4.15.21	4.11.25	4. 7.29	4. 3.33
7	4.44. 6	4.40.10	4.36.14	4.32.19	4.28.23	4.24.27	4.20 31	4.16.35
8	5.26.40	5.22.44	5.18.48	5.14.52	5.10.56	5. 7. 0	5. 3. 4	4.59. 8
9	5.45.42	5.41.46	5.37.50	5.33.54	5.29.58	5.26. 2	5.22. 6	5.18.10
*10†	6.59.15	6.55.19	6.51.23	6.47.27	6.43.32	6.39.36	6.35.40	6.31.44
*11	7.37.21	7.33.25	7.29.29	7.25.33	7.21.37	7.17.41	7.13.45	7. 9.49
*12	7.39.13	7.35.17	7.31.21	7.27.25	7.23.29	7.19.33	7.15.37	7.11.41
13	7.48.35	7.44.39	7.40.43	7.36.47	7.32.51	7.28.55	7.24.59	7.21. 3
*14	8.18.47	8.14.51	8.10.55	8. 6.59	8. 3. 4	7.59. 8	7.55.12	7.51.16
*15	8.52.27	8.48.31	8.44.36	8.40.40	8.36.44	8.32.48	8.28.52	8.24.56
*16	9.10.12	9. 6.16	9. 2.20	8.58.24	8.54.28	8.50.32	8.46.36	8.42.40
17	9.56.26	9.52.30	9.48.34	9.44.38	9.40.42	9.36.46	9.32.50	9.28.55
*18	10. 2.54	9.58.58	9.55. 3	9.51. 7	9.47.11	9.43.15	9.39.19	9.35.23
19†	10. 7.31	10. 3.36	9.59.40	9.55.44	9.51.48	9.47.52	9.43.56	9.40. 0
*20	11.43. 2	11.39. 6	11.35.10	11.31.14	11.27.18	11.23.22	11.19.26	11.15.30
21	11.51.24	11.47.28	11.43.32	11.39.36	11.35.40	11.31.44	11.27.48	11.23.53
*22†	12.31.26	12.27.30	12.23.34	12.19.38	12.15.42	12.11.46	12. 7.50	12. 3.54
*23	13.25.16	13.21.20	13.17.24	13.13.29	13. 9.33	13. 5.37	13. 1.41	12.57.45
24	14.12.11	14. 8.15	14. 4.20	14. 0.24	13.56.28	13.52.32	13.48.36	13.44.40
*25	14.48.58	14.45. 2	14.41. 6	14.37.10	14.33.14	14.29.18	14.25.22	14.21.26
*26†	15.47.49	15.43.53	15.39.57	15.36. 1	15.32. 5	15.28. 9	15.24.13	15.20.17
27	16.12. 9	16. 8.13	16. 4.17	16. 0.21	15.56.25	15.52.29	15.48.33	15.44.38
*28	16.23.36	16.19.40	16.15.45	16.11.49	16. 7.53	16. 3.57	16. 0. 1	15.56. 5
*29	16.39.14	16.35.18	16.31.22	16.27.26	16.23.31	16.19.35	16.15.39	16.11.43
*30	16.59.42	16.55.46	16.51.50	16.47.54	16.43.58	16.40. 2	16.36. 6	16.32.11
31	17.39. 9	17.35.13	17.31.17	17.27.21	17.23.25	17.19.29	17.15.33	17.11.37
32	17.58.33	17.54.37	17.50.41	17.46.46	17.42.50	17.38.54	17.34.58	17.31. 2
33	18. 7. 2	18. 3. 6	17.59.10	17.55.14	17.51.18	17.47.23	17.43.27	17.39.31
*34†	18.50.11	18.46.15	18.42.19	18.38.23	18.34.27	18.30.31	18.26.35	18.22.40
35	19.37.44	19.33.48	19.29.52	19.25.56	19.22. 1	19.18. 5	19.14. 9	19.10.13
36	19.57.50	19.53.54	19.49.59	19.46. 3	19.42. 7	19.38.11	19.34.15	19.30.19
37	20.23. 4	20.19. 8	20.15.12	20.11.16	20. 7.20	20. 3.24	19.59.28	19.55.32
*38	21. 1.37	20.57.42	20.53.46	20.49.50	20.45.54	20.41.58	20.38. 2	20.34. 6
*39†	22.12.57	22. 9. 1	22. 5. 5	22. 1. 9	21.57.13	21.53.17	21.49.21	21.45.25
40	22.42.58	22.39. 2	22.35. 6	22.31.10	22.27.14	22.23.18	22.19.22	22.15.26
*41	23. 5.45	23. 1.49	22.57.53	22.53.57	22.50. 1	22.46. 5	22.42. 9	22.38.13
42	0.31.42	0.27.47	0.23.51	0.19.55	0.15.59	0.12. 3	0. 8. 7	0. 4.11
*43†	1.22.13	1.18.17	1.14.21	1.10.25	1. 6.29	1. 2.33	0.58.37	0.54.42
44†	1.30.10	1.26.14	1.22.18	1.18.23	1.14.27	1.10.31	1. 6.35	1. 2.39

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

FEBRUARY, 1844.

Day.	20	21	22	23	24	25
Eqn. of Time.	14m. 5s. sub.	13m. 59s. sub.	13m. 52s. sub.	13m. 44s. sub.	13m. 36s. sub.	13m. 26s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	2. 1.53	1.57.57	1.54. 1	1.50. 5	1.46.10	1.42.14
2	2. 6.45	2. 2.49	1.58.53	1.54.57	1.51. 1	1.47. 5
3	2.37.13	2.33.17	2.29.21	2.25.25	2.21.29	2.17.33
4	3. 2.23	2.58.27	2.54.31	2.50.35	2.46.39	2.42.43
*5	3.33.12	3.29.16	3.25.20	3.21.24	3.17.28	3.13.32
6†	3.59.37	3.55.41	3.51.45	3.47.49	3.43.54	3.39.58
7	4.12.39	4. 8.43	4. 4.47	4. 0.51	3.56.55	3.53. 0
8	4.55.12	4.51.17	4.47.21	4.43.25	4.39.29	4.35.33
9	5.14.14	5.10.18	5. 6.23	5. 2.27	4.58.31	4.54.35
*10†	6.27.48	6.23.52	6.19.56	6.16. 0	6.12. 4	6. 8. 8
*11	7. 5.54	7. 1.58	6.58. 2	6.54. 6	6.50.10	6.46.14
*12	7. 7.45	7. 3.49	6.59.54	6.55.58	6.52. 2	6.48. 6
13	7.17. 7	7.13.11	7. 9.16	7. 5.20	7. 1.24	6.57.28
*14	7.47.20	7.43.24	7.39.28	7.35.32	7.31.36	7.27.40
*15	8.21. 0	8.17. 4	8.13. 8	8. 9.12	8. 5.17	8. 1.21
*16	8.38.44	8.34.48	8.30.53	8.26.57	8.23. 1	8.19. 5
17	9.24.59	9.21. 3	9.17. 7	9.13.11	9. 9.15	9. 5.19
*18	9.31.27	9.27.31	9.23.35	9.19.39	9.15.44	9.11.48
19†	9.36. 4	9.32. 8	9.28.12	9.24.17	9.20.21	9.16.25
*20	11.11.34	11. 7.38	11. 3.43	10.59.47	10.55.51	10.51.55
21	11.19.57	11.16. 1	11.12. 5	11. 8. 9	11. 4.13	11. 0.17
*22†	11.59.58	11.56. 3	11.52. 7	11.48.11	11.44.15	11.40.19
*23	12.53.49	12.49.53	12.45.57	12.42. 1	12.38. 5	12.34.10
24	13.40.44	13.36.48	13.32.52	13.28.56	13.25. 1	13.21. 5
*25	14.17.31	14.13.35	14. 9.39	14. 5.43	14. 1.47	13.57.51
*26†	15.16.21	15.12.26	15. 8.30	15. 4.34	15. 0.38	14.56.42
27	15.40.42	15.36.46	15.32.50	15.28.54	15.24.58	15.21. 2
*28	15.52. 9	15.48.13	15.44.17	15.40.21	15.36.26	15.32.30
*29	16. 7.47	16. 3.51	15.59.55	15.55.59	15.52. 3	15.48. 7
*30	16.28.15	16.24.19	16.20.23	16.16.27	16.12.31	16. 8.35
31	17. 7.41	17. 3.45	16.59.50	16.55.54	16.51.58	16.48. 2
32	17.27. 6	17.23.10	17.19.14	17.15.18	17.11.22	17. 7.27
33	17.35.35	17.31.39	17.27.43	17.23.47	17.19.51	17.15.55
*34†	18.18.44	18.14.48	18.10.52	18. 6.56	18. 3. 0	17.59. 4
35	19. 6.17	19. 2.21	18.58.25	18.54.29	18.50.33	18.46.37
36	19.26.23	19.22.27	19.18.31	19.14.35	19.10.40	19. 6.44
37	19.51.36	19.47.41	19.43.45	19.39.49	19.35.53	19.31.57
*38	20.30.10	20.26.14	20.22.18	20.18.23	20.14.27	20.10.31
*39†	21.41.30	21.37.34	21.33.38	21.29.42	21.25.46	21.21.50
40	22.11.30	22. 7.35	22. 3.39	21.59.43	21.55.47	21.51.51
*41	22.34.17	22.30.22	22.26.26	22.22.30	22.18.34	22.14.38
42	0. 0. 15 23. 56. 19	23.52.23	23.48.28	23.44.32	23.40.36	23.36.40
*43†	0.50.46	0.46.50	0.42.54	0.38.58	0.35. 2	0.31. 6
44†	0.58.43	0.54.47	0.50.51	0.46.55	0.42.59	0.39. 4

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.13	1.20
24	0.15	1.36
28	0.18	1.52
32	0.21	2. 8
36	0.23	2.24
40	0.26	2.40
44	0.28	2.56
48	0.31	3.12
52	0.33	3.28
56	0.36	3.44
60	0.39	4. 0
64	0.41	4.16
68	0.44	4.32
72	0.46	4.48
76	0.49	5. 4
80	0.51	5.20
84	0.54	5.36
88	0.57	5.52
92	0.59	6. 8
96	1. 2	6.24
100	1. 4	6.40
104	1. 7	6.56
108	1. 9	7.12
112	1.12	7.28
116	1.15	7.44
120	1.17	8. 0
124	1.20	8.16
128	1.22	8.32
132	1.25	8.48
136	1.27	9. 4
140	1.30	9.20
144	1.33	9.36
148	1.35	9.52
152	1.38	10. 8
156	1.40	10.24
160	1.43	10.40
164	1.45	10.56
168	1.48	11.12
172	1.51	11.28
176	1.53	11.44
180	1.56	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

FEBRUARY. 1844. MARCH.

Day.	26	27	28	29	1	2	3	4
Eqn. of Time.	13m. 17s. sub.	13m. 7s. sub.	12m. 56s. sub.	12m. 44s. sub.	12m. 32s. sub.	12m. 20s. sub.	12m. 7s. sub.	11m. 53s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	1.38.18	1.34.22	1.30.26	1.26.30	1.22.34	1.18.38	1.14.42	1.10.46
2	1.43. 9	1.39.13	1.35.18	1.31.22	1.27.26	1.23.30	1.19.34	1.15.38
3	2.13.37	2. 9.41	2. 5.45	2. 1.49	1.57.54	1.53.58	1.50. 2	1.46. 6
4	2.38.47	2.34.51	2.30.55	2.26.59	2.23. 4	2.19. 8	2.15.12	2.11.16
*5	3. 9.36	3. 5.41	3. 1.45	2.57.49	2.53.53	2.49.57	2.46. 1	2.42. 5
6†	3.36. 2	3.32. 6	3.28.10	3.24.14	3.20.18	3.16.22	3.12.26	3. 8.30
7	3.49. 4	3.45. 8	3.41.12	3.37.16	3.33.20	3.29.24	3.25.28	3.21.32
8	4.31.37	4.27.41	4.23.45	4.19.49	4.15.53	4.11.58	4. 8. 2	4. 4. 6
9	4.50.39	4.46.43	4.42.47	4.38.51	4.34.55	4.30.59	4.27. 4	4.23. 8
*10†	6. 4.13	6. 0.17	5.56.21	5.52.25	5.48.29	5.44.33	4.40.37	4.36.41
*11	6.42.18	6.38.22	6.34.26	6.30.30	6.26.35	6.22.39	6.18.43	6.14.47
*12	6.44.10	6.40.14	6.36.18	6.32.22	6.28.26	6.24.30	6.20.35	6.16.39
13	6.53.32	6.49.36	6.45.40	6.41.44	6.37.48	6.33.52	6.29.57	6.26. 1
*14	7.23.45	7.19.49	7.15.53	7.11.57	7. 8. 1	7. 4. 5	7. 0. 9	6.56.13
*15	7.57.25	7.53.29	7.49.33	7.45.37	7.41.41	7.37.45	7.33.49	7.29.53
*16	8.15. 9	8.11.13	8. 7.17	8. 3.21	7.59.25	7.55.29	7.51.34	7.47.38
17	9. 1.23	8.57.27	8.53.31	8.49.36	8.45.40	8.41.44	8.37.48	8.33.52
*18	9. 7.52	9. 3.56	9. 0. 0	8.56. 4	8.52. 8	8.48.12	8.44.16	8.40.20
19†	9.12.29	9. 8.33	9. 4.37	9. 0.41	8.56.45	8.52.49	8.48.53	8.44.58
*20	10.47.59	10.44. 3	10.40. 7	10.36.11	10.32.15	10.28.19	10.24.24	10.20.28
21	10.56.21	10.52.25	10.48.29	10.44.34	10.40.38	10.36.42	10.32.46	10.28.50
*22†	11.36.23	11.32.27	11.28.31	11.24.35	11.20.39	11.16.44	11.12.48	11. 8.52
*23	12.30.14	12.26.18	12.22.22	12.18.26	12.14.30	12.10.34	12. 6.38	12. 2.42
24	13.17. 9	13.13.13	13. 9.17	13. 5.21	13. 1.25	12.57.29	12.53.33	12.49.37
*25	13.53.55	13.49.59	13.46. 3	13.42. 7	13.38.12	13.34.16	13.30.20	13.26.24
*26†	14.52.46	14.48.50	14.44.54	14.40.58	14.37. 2	14.33. 7	14.29.11	14.25.15
27	15.17. 6	15.13.10	15. 9.14	15. 5.19	15. 1.23	14.57.27	14.53.31	14.49.35
*28	15.28.34	15.24.38	15.20.42	15.16.46	15.12.50	15. 8.54	15. 4.58	15. 1. 2
*29	15.44.12	15.40.16	15.36.20	15.32.24	15.28.28	15.24.32	15.20.36	15.16.40
*30	16. 4.39	16. 0.43	15.56.47	15.52.52	15.48.56	15.45. 0	15.41. 4	15.37. 8
31	16.44. 6	16.40.10	16.36.14	16.32.18	16.28.22	16.24.26	16.20.31	16.16.35
32	17. 3.31	16.59.35	16.55.39	16.51.43	16.47.47	16.43.51	16.39.55	16.35.59
33	17.11.59	17. 8. 4	17. 4. 8	17. 0.12	16.56.16	16.52.20	16.48.24	16.44.28
*34†	17.55. 8	17.51.12	17.47.16	17.43.21	17.39.25	17.35.29	17.31.33	17.27.37
35	18.42.42	18.38.46	18.34.50	18.30.54	18.26.58	18.23. 2	18.19. 6	18.15.10
36	19. 2.48	18.58.52	18.54.56	18.51. 0	18.47. 4	18.43. 8	18.39.12	18.35.16
37	19.28. 1	19.24. 5	19.20. 9	19.16.13	19.12.17	19. 8.22	19. 4.26	19. 0.30
*38	20. 6.35	20. 2.39	19.58.43	19.54.47	19.50.51	19.46.55	19.42.59	19.39. 4
*39†	21.17.54	21.13.58	21.10. 2	21. 6. 6	21. 2.11	20.58.15	20.54.19	20.50.23
40	21.47.55	21.43.59	21.40. 3	21.36. 7	21.32.12	21.28.16	21.24.20	21.20.24
*41	22.10.42	22. 6.46	22. 2.50	21.58.54	21.54.58	21.51. 3	21.47. 7	21.43.11
42	23.32.44	23.28.48	23.24.52	23.20.56	23.17. 0	23.13. 4	23. 9. 9	23. 5.13
*43†	0.27.10	0.23.14	0.19.18	0.15.23	0.11.27	0. 7.31	0. 3. 35 23. 59. 39	23.55.43
44†	0.35. 8	0.31.12	0.27.16	0.23.20	0.19.24	0.15.28	0.11.32	0. 7.36

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MARCH, 1844.

Day.	5	6	7	8	9	10
Eqn. of Time.	11m. 40s. sub.	11m. 25s. sub.	11m. 11s. sub.	10m. 56s. sub.	10m. 40s. sub.	10m. 25s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	1. 6.51	1. 2.55	0.58.59	0.55. 3	0.51. 7	0.47.11
2	1.11.42	1. 7.46	1. 3.50	0.59.54	0.55.59	0.52. 3
3	1.42.10	1.38.14	1.34.18	1.30.22	1.26.26	1.22.30
4	2. 7.20	2. 3.24	1.59.28	1.55.32	1.51.36	1.47.40
*5	2.38. 9	2.34.13	2.30.17	2.26.22	2.22.26	2.18.30
6†	3. 4.35	3. 0.39	2.56.43	2.52.47	2.48.51	2.44.55
7	3.17.36	3.13.41	3. 9.45	3. 5.49	3. 1.53	2.57.57
8	4. 0.10	3.56.14	3.52.18	3.48.22	3.44.26	3.40.30
9	4.19.12	4.15.16	4.11.20	4. 7.24	4. 3.28	3.59.32
*10†	5.32.45	5.28.49	5.24.54	5.20.58	5.17. 2	5.13. 6
*11	6.10.51	6. 6.55	6. 2.59	5.59. 3	5.55. 7	5.51.11
*12	6.12.43	6. 8.47	6. 4.51	6. 0.55	5.56.59	5.53. 3
13	6.22. 5	6.18. 9	6.14.13	6.10.17	6. 6.21	6. 2.25
*14	6.52.17	6.48.21	6.44.26	6.40.30	6.36.34	6.32.38
*15	7.25.57	7.22. 1	7.18. 5	7.14. 9	7.10.13	7. 6.17
*16	7.43.42	7.39.46	7.35.50	7.31.54	7.27.58	7.24. 2
17	8.29.56	8.26. 0	8.22. 4	8.18. 8	8.14.12	8.10.17
*18	8.36.24	8.32.28	8.28.32	8.24.36	8.20.40	8.16.44
19†	8.41. 2	8.37. 6	8.33.10	8.29.14	8.25.18	8.21.22
*20	10.16.31	10.12.35	10. 8.39	10. 4.43	10. 0.47	9.56.51
21	10.24.54	10.20.58	10.17. 2	10.13. 6	10. 9.10	10. 5.15
*22†	11. 4.56	11. 1. 0	10.57. 4	10.53. 8	10.49.12	10.45.16
*23	11.58.46	11.54.51	11.50.55	11.46.59	11.43. 3	11.39. 7
24	12.45.42	12.41.46	12.37.50	12.33.54	12.29.58	12.26. 2
*25	13.22.28	13.18.32	13.14.36	13.10.40	13. 6.44	13. 2.48
*26†	14.21.19	14.17.23	14.13.27	14. 9.31	14. 5.35	14. 1.39
27	14.45.39	14.41.43	14.37.47	14.33.51	14.29.55	14.26. 0
*28	14.57. 7	14.53.11	14.49.15	14.45.19	14.41.23	14.37.27
*29	15.12.44	15. 8.48	15. 4.53	15. 0.57	14.57. 1	14.53. 5
*30	15.33.12	15.29.16	15.25.20	15.21.24	15.17.28	15.13.33
31	16.12.39	16. 8.43	16. 4.47	16. 0.51	15.56.55	15.52.59
32	16.32. 3	16.28. 8	16.24.12	16.20.16	16.16.20	16.12.24
33	16.40.32	16.36.36	16.32.40	16.28.45	16.24.49	16.20.53
*34†	17.23.41	17.19.45	17.15.49	17.11.53	17. 7.57	17. 4. 2
35	18.11.14	18. 7.18	18. 3.23	17.59.27	17.55.31	17.51.35
36	18.31.21	18.27.25	18.23.29	18.19.33	18.15.37	18.11.41
37	18.56.34	18.52.38	18.48.42	18.44.46	18.40.50	18.36.54
*38	19.35. 8	19.31.12	19.27.16	19.23.20	19.19.24	19.15.28
*39†	20.46.27	20.42.31	20.38.35	20.34.39	20.30.43	20.26.47
40	21.16.28	21.12.32	21. 8.36	21. 4.40	21. 0.44	20.56.48
*41	21.39.15	21.35.19	21.31.23	21.27.27	21.23.31	21.19.35
42	23. 1.17	22.57.21	22.53.25	22.49.29	22.45.33	22.41.37
*43†	23.51.47	23.47.51	23.43.55	23.39.59	23.36. 4	23.32. 8
44†	0. 3. 40 23. 59. 45	23.55.49	23.51.53	23.47.57	23.44. 1	23.40. 5

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.20	2. 8
36	0.22	2.24
40	0.25	2.40
44	0.27	2.56
48	0.30	3.12
52	0.32	3.28
56	0.35	3.44
60	0.37	4. 0
64	0.40	4.16
68	0.42	4.32
72	0.45	4.48
76	0.47	5. 4
80	0.50	5.20
84	0.52	5.36
88	0.55	5.52
92	0.57	6. 8
96	1. 0	6.24
100	1. 2	6.40
104	1. 4	6.56
108	1. 7	7.12
112	1. 9	7.28
116	1.12	7.44
120	1.14	8 0
124	1.17	8.16
128	1.19	8.32
132	1.22	8.48
136	1.24	9. 4
140	1.27	9.20
144	1.29	9.36
148	1.32	9.52
152	1.34	10. 8
156	1.37	10.24
160	1.39	10.40
164	1.42	10.56
168	1.44	11.12
172	1.47	11.28
176	1.49	11.44
180	1.52	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MARCH, 1844.

Day.	11	12	13	14	15	16	17	18
Eqn. of Time.	10m. 8s. sub.	9m. 52s. sub.	9m. 36s. sub.	9m. 19s. sub.	9m. 2s. sub.	8m. 44s. sub.	8m. 27s. sub.	8m. 9s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	0.43.15	0.39.19	0.35.23	0.31.27	0.27.32	0.23.36	0.19.40	0.15.44
2	0.48. 7	0.44.11	0.40.15	0.36.19	0.32.23	0.28.27	0.24.31	0.20.35
3	1.18.35	1.14.39	1.10.43	1. 6.47	1. 2.51	0.58.55	0.54.59	0.51. 3
4	1.43.45	1.39.49	1.35.53	1.31.57	1.28. 1	1.24. 5	1.20. 9	1.16.13
*5	2.14.34	2.10 38	2. 6.42	2. 2.46	1.58.50	1.54.54	1.50.58	1.47. 3
6†	2.40.59	2.37. 3	2.33. 7	2.29 11	2.25.16	2.21.20	2.17.24	2.13.28
7	2.54. 1	2.50. 5	2.46. 9	2.42.13	2.38.17	2.34.22	2.30.26	2.26.30
8	3.36.34	3.32.38	3.28.43	3.24.47	3.20.51	3.16.55	3.12.59	3. 9. 3
9	3.55.36	3.51.40	3.47.45	3.43.49	3.39.53	3.35.57	3.32. 1	3.28. 5
*10†	5. 9.10	5. 5.14	5. 1.18	4.57.22	4.53.26	4.49.30	4.45.35	4.41.39
*11	5.47.16	5.43.20	5.39.24	5.35.28	5.31.32	5.27.36	5.23.40	5.19.44
*12	5.49. 7	5.45.11	5.41.16	5.37.20	5.33.24	5.29.28	5.25.32	5.21.36
13	5.58.29	5.54.33	5.50.38	5.46.42	5.42.46	5.38.50	5.34.54	5.30.58
*14	6.28.42	6.24.46	6.20.50	6.16.54	6.12.58	6. 9. 2	6. 5. 7	6. 1.11
*15	7. 2.22	6.58.26	6.54.30	6.50.34	6.46.39	6.42.43	6.38.47	6.34.51
*16	7.20. 6	7.16.10	7.12.15	7. 8.19	7. 4.23	7. 0.27	6.56.31	6.52.35
17	8. 6.21	8. 2.25	7.58.29	7.54.33	7.50.37	7.46.41	7.42.45	7.38.49
*18	8.12.48	8. 8.52	8. 4.57	8. 1. 1	7.57. 6	7.53.10	7.49.14	7.45.18
19†	8.17.26	8.13.30	8. 9.34	8. 5.39	8. 1.43	7.57.47	7.53.51	7.49.55
*20	9.52.55	9.48.59	9.45. 4	9.41. 8	9.37.12	9.33.16	9.29.20	9.25.24
21	10. 1.19	9.57.23	9.53.27	9.49.31	9.45.35	9.41.39	9.37.43	9.33.47
*22†	10.41.20	10.37.25	10.33.29	10.29.33	10.25.37	10.21.41	10.17.45	10.13.49
*23	11.35.11	11.31.15	11.27.19	11.23.23	11.19.27	11.15.32	11.11.36	11. 7.40
24	12.22. 6	12.18.10	12.14.14	12.10.18	12. 6.23	12. 2.27	11.58.31	11.54.35
*25	12.58.53	12.54.57	12.51. 1	12.47. 5	12.43. 9	12.39.13	12.35.17	12.31.21
*26†	13.57.43	13.53.48	13.49.52	13.45.56	13.42. 0	13.38. 4	13.34. 8	13.30.12
27	14.22. 4	14.18. 8	14.14.12	14.10.16	14. 6.20	14. 2.24	13.58.28	13.54.32
*28	14.33.31	14.29.35	14.25.39	14.21.43	14.17.48	14.13.52	14. 9.56	14. 6. 0
*29	14.49. 9	14.45.13	14.41.17	14.37.21	14.33.25	14.29.29	14.25.34	14.21.38
*30	15. 9.37	15. 5.41	14. 1.45	14.57.49	14.53.53	14.49.57	14.46. 1	14.42. 5
31	15.49. 3	15.45. 7	15.41.12	15.37.16	15.33.20	15.29.24	15.25.28	15.21.32
32	16. 8.28	16. 4.32	16. 0.36	15.56.40	15.52.44	15.48.49	15.44.53	15.40.57
33	16.16.57	16.13. 1	16. 9. 5	16. 5. 9	16. 1.13	15.57.17	15.53.21	15.49.26
*34†	17. 0. 6	16.56.10	16.52.14	16.48.18	16.44.22	16.40.26	16.36.30	16.32.34
35	17.47.39	17.43.43	17.39.47	17.35.51	17.31.55	17.27.59	17.24. 4	17.20. 8
36	18. 7.45	18. 3.49	17.59.53	17.55.57	17.52. 2	17.48. 6	17.44.10	17.40.14
37	18.32.58	18.29. 3	18.25. 7	18.21.11	18.17.15	18.13.19	18. 9.23	18. 5.27
*38	19.11.32	19. 7.36	19. 3.40	18.59.45	18.55.49	18.51.53	18.47.57	18.44. 1
*39†	20.22.52	20.18.56	20.15. 0	20.11. 4	20. 7. 8	23. 3.12	19.59.16	19.55.20
40	20.52.53	20.48.57	20.45. 1	20.41. 5	20.37. 9	20.33.13	20.29.17	20.25.21
*41	21.15.39	21.11.44	21. 7.48	21. 3.52	20.59.56	20.56. 0	20.52. 4	20.48. 8
42	22.37.41	22.33.45	22.29.50	22.25.54	22.21.58	22.18. 2	22.14. 6	22.10.10
*43†	23.28.12	23.24.16	23.20.20	23.16.24	23.12.28	23. 8.32	23. 4.36	23. 0.40
44†	23 36. 9	23.32.13	23.28.17	23.24.21	23.20.26	23.16.30	23.12.34	23. 8.38

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MARCH, 1844.

Day.	19	20	21	22	23	24
Equ. of Time.	7m. 51s. sub.	7m. 33s. sub.	7m. 15s. sub.	6m. 57s. sub.	6m. 39s. sub.	6m. 20s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	0.11.48	0. 7.52	0. 3.56	0. 0. 0 23. 56. 4	23.52. 8	23.48.13
2	0.16.40	0.12.44	0. 8.48	0. 4.52	0. 0. 56 23. 57. 0	23.53. 4
3	0.47. 7	0.43.11	0.39.16	0.35.20	0.31.24	0.27.28
4	1.12.17	1. 8.21	1. 4.26	1. 0.30	0.56.34	0.52.38
*5	1.43. 7	1.39.11	1.35.15	1.31.19	1.27.23	1.23.27
6†	2. 9.32	2. 5.36	2. 1.40	1.57.44	1.53.48	1.49.52
7	2.22.34	2.18.38	2.14.42	2.10.46	2. 6.50	2. 2.54
8	3. 5. 7	3. 1.11	2.57.15	2.53.20	2.49.24	2.45.28
9	3.24. 9	3.20.13	3.16.17	3.12.21	3. 8.26	3. 4.30
*10†	4.37.43	4.33.47	4.29.51	4.25.55	4.21.59	4.18. 3
*11	5.15.48	5.11.52	5. 7.57	5. 4. 1	5. 0. 5	4.56. 9
*12	5.17.40	5.13.44	5. 9.48	5. 5.52	5. 1.57	4.58. 1
13	5.27. 2	5.23. 6	5.19.10	5.15.14	5.11.19	5. 7.23
*14	5.57.15	5.53.19	5.49.23	5.45.27	5.41.31	5.37.35
*15	6.30.55	6.26.59	6.23. 3	6.19. 7	6.15.11	6.11.15
*16	6.48.39	6.44.43	6.40.47	6.36.51	6.32.56	6.29. 0
17	7.34.53	7.30.58	7.27. 2	7.23. 6	7.19.10	7.15.14
*18	7.41.22	7.37.26	7.33.30	7.29.34	7.25.38	7.21.42
19†	7.45.59	7.42. 3	7.38. 7	7.34.11	7.30.15	7.26.20
*20	9.21.28	9.17.32	9.13.36	9. 9.40	9. 5.45	9. 1.49
21	9.29.51	9.25.56	9.22. 0	9.18. 4	9.14. 8	9.10.12
*22†	10. 9.53	10. 5.57	10. 2. 1	9.58. 6	9.54.10	9.50.14
*23	11. 3.44	10.59.48	10.55.52	10.51.56	10.48. 0	10.44. 4
24	11.50.39	11.46.43	11.42.47	11.38.51	11.34.55	11.30.59
*25	12.27.25	12.23.29	12.19.34	12.15.38	12.11.42	12. 7.46
*26†	13.26.16	13.22.20	13.18.24	13.14.29	13.10.33	13. 6.37
27	13.50.36	13.46.41	13.42.45	13.38.49	13.34.53	13.30.57
*28	14. 2. 4	13.58. 8	13.54.12	13.50.16	13.46.20	13.42.24
*29	14.17.42	14.13.46	14. 9.50	14. 5.54	14. 1.58	13.58. 2
*30	14.38. 9	14.34.14	14.30.18	14.26.22	14.22.26	14.18.30
31	15.17.36	15.13.40	15. 9.44	15. 5.48	15. 1.53	14.57.57
32	15.37. 1	15.33. 5	15.29. 9	15.25.13	15.21.17	15.17.21
33	15.45.30	15.41.34	15.37.38	15.33.42	15.29.46	15.25.50
*34†	16.28.38	16.24.43	16.20.47	16.16.51	16.12.55	16. 8.59
35	17.16.12	17.12.16	17. 8.20	17. 4.24	17. 0.28	16.56.32
36	17.36.18	17.32.22	17.28.26	17.24.30	17.20.34	17.16.38
37	18. 1.31	17.57.35	17.53.39	17.49.44	17.45.48	17.41.52
*38	18.40. 5	18.36. 9	18.32.13	18.28.17	18.24.21	18.20.26
*39†	19.51.24	19.47.28	19.43.33	19.39.37	19.35.41	19.31.45
40	20.21.25	20.17.29	20.13.34	20. 9.38	20. 5.42	20. 1.46
*41	20.44.12	20.40.16	20.36.20	20.32.25	20.28.29	20.24.33
42	22. 6.14	22. 2.18	21.58.22	21.54.26	21.50.31	21.46.35
*43†	22.56.45	22.52.49	22.48.53	22.44.57	22.41. 1	22.37. 5
44†	23. 4.42	23. 0.46	22.56.50	22.52.54	22.48.58	22.45. 2

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.20	2. 8
36	0.22	2.24
40	0.24	2.40
44	0.27	2,56
48	0.29	3.12
52	0.32	3.28
56	0.34	3.44
60	0.37	4. 0
64	0.39	4.16
68	0.41	4.32
72	0.44	4.48
76	0.46	5. 4
80	0.49	5.20
84	0.51	5.36
88	0.53	5.52
92	0.56	6. 8
96	0.58	6.24
100	1. 1	6.40
104	1. 3	6.56
108	1. 6	7.12
112	1. 8	7.28
116	1.11	7.44
120	1.13	8 0
124	1.15	8.16
128	1.18	8.32
132	1.20	8.48
136	1.23	9. 4
140	1.25	9.20
144	1.28	9.36
148	1.30	9.52
152	1.33	10. 8
156	1.35	10.24
160	1.37	10.40
164	1.40	10.56
168	1.42	11.12
172	1.45	11.28
176	1.47	11.44
180	1.50	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

				MARCH.		1844.		APRIL.
Day.	25	26	27	28	29	30	31	1
Eqn. of Time.	6m. 2s. sub.	5m. 43s. sub.	5m. 25s. sub.	5m. 6s. sub.	4m. 48s. sub.	4m. 29s. sub.	4m. 11s. sub.	3m. 53s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	23.44.17	23.40.21	23.36.25	23.32.29	23.28.33	23.24.37	23.20.41	23.16.45
2	23.49. 8	23.45.12	23.41.16	23.37.21	23.33.25	23.29.29	23.25.33	23.21.37
3	0.23.32	0.19.36	0.15.40	0.11.44	0. 7.48	0. 3. 52 23. 59. 57	23.56. 1	23.52. 5
4	0.48.42	0.44.46	0.40.50	0.36.54	0.32.58	0.29. 2	0.25. 7	0.21.11
*5	1.19.31	1.15.35	1.11.39	1. 7.44	1. 3.48	0.59.52	0.55.56	0.52. 0
6†	1.45.57	1.42. 1	1.38. 5	1.34. 9	1.30.13	1.26.17	1.22.21	1.18.25
7	1.58.58	1.55. 3	1.51. 7	1.47.11	1.43.15	1.39.19	1.35.23	1.31.27
8	2.41.32	2.37.36	2.33.40	2.29.44	2.25.48	2.21.52	2.17.56	2.14. 1
9	3. 0.34	2.56.38	2.52.42	2.48.46	2.44.50	2.40.54	2.36.58	2.33. 2
*10†	4.14. 7	4.10.11	4. 6.16	4. 2.20	3.58.24	3.54.28	3.50.32	3.46.36
*11	4.52.13	4.48.17	4.44.21	4.40.25	4.36.29	4.32.33	4.28.38	4.24.42
*12	4.54. 5	4.50. 9	4.46.13	4.42.17	4.38.21	4.34.25	4.30.29	4.26.33
13	5. 3.27	4.59.31	4.55.35	4.51.39	4.47.43	4.43.47	4.39.51	4.35.55
*14	5.33.39	5.29.43	5.25.48	5.21.52	5.17.56	5.14. 0	5.10. 4	5. 6. 8
*15	6. 7.20	6. 3.24	5.59.28	5.55.32	5.51.36	5.47.40	5.43.44	5.39.48
*16	6.25. 4	6.21. 8	6.17.12	6.13.16	6. 9.20	6. 5.24	6. 1.28	5.57.32
17	7.11.18	7. 7.22	7. 3.26	6.59.30	6.55.34	6.51.39	6.47.43	6.43.47
*18	7.17.47	7.13.51	7. 9.55	7. 5.59	7. 2. 3	6.58. 7	6.54.11	6.50.15
19†	7.22.24	7.18.28	7.14.32	7.10.36	7. 6.40	7. 2.44	6.58.48	6.54.52
*20	8.57.53	8.53.57	8.50. 1	8.46. 5	8.42. 9	8.38.13	8.34.17	8.30.21
21	9. 6.16	9. 2.20	8.58.24	8.54.28	8.50.32	8.46.37	8.42.41	8.38.45
*22†	9.46.18	9.42.22	9.38.26	9.34.30	9.30.34	9.26.38	9.22.42	9.18.47
*23	10.40. 8	10.36.13	10.32.17	10.28.21	10.24.25	10.20.29	10.16.33	10.12.37
24	11.27. 4	11.23. 8	11.19.12	11.15.16	11.11.20	11. 7.24	11. 3.28	10.59.32
*25	12. 3.50	11.59.54	11.55.58	11.52. 2	11.48. 6	11.44.10	11.40.15	11.36.19
*26†	13. 2.41	12.58.45	12.54.49	12.50.53	12.46.57	12.43. 1	12.39. 5	12.35.10
27	13.27. 1	13.23. 5	13.19. 9	13.15.13	13.11.17	13. 7.22	13. 3.26	12.59.30
*28	13.38.29	13.34.33	13.30.37	13.26.41	13.22.45	13.18.49	13.14.53	13.10.57
*29	13.54. 6	13.50.10	13.46.15	13.42.19	13.38.23	13.34.27	13.30.31	13.26.35
*30	14.14.34	14.10.38	14. 6.42	14. 2.46	13.58.50	13.54.55	13.50.59	13.47. 3
31	14.54. 1	14.50. 5	14.46. 9	14.42.13	14.38.17	14.34.21	14.30.25	14.26.29
32	15.13.25	15. 9.30	15. 5.34	15. 1.38	14.57.42	14.53.46	14.49.50	14.45.54
33	15.21.54	15.17.58	15.14. 2	15.10. 7	15. 6.11	15. 2.15	14.58.19	14.54.23
*34†	16. 5. 3	16. 1. 7	15.57.11	15.53.15	15.49.19	15.45.24	15.41.28	15.37.32
35	16.52.36	16.48.40	16.44.45	16.40.49	16.36.53	16.32.57	16.29. 1	16.25. 5
36	17.12.43	17. 8.47	17. 4.51	17. 0.55	16.56.59	16.53. 3	16.49. 7	16.45.11
37	17.37.56	17.34. 0	17.30. 4	17.26. 8	17.22.12	17.18.16	17.14.20	17.10.25
*38	18.16.30	18.12.34	18. 8.38	18. 4.42	18. 0.46	17.56.50	17.52.54	17.48.58
*39†	19.27.49	19.23.53	19.19.57	19.16. 1	19.12. 5	19. 8. 9	19. 4.14	19. 0.18
40	19.57.50	19.53.54	19.49.58	19.46. 2	19.42. 6	19.38.10	19.34.15	19.30.19
*41	20.20.37	20.16.41	20.12.45	20. 8.49	20. 4.53	20. 0.57	19.57. 1	19.53. 6
42	21.42.39	21.38.43	21.34.47	21.30.51	21.26.55	21.22.59	21.19. 3	21.15. 7
*43†	22.33. 9	22.29.13	22.25.17	22.21.21	22.17.26	22.13.30	22. 9.34	22. 5.38
44†	22.41. 7	22.37.11	22.33.15	22.29.19	22.25.23	22.21.27	22.17.31	22.13.35

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

APRIL, 1844.

Day.	2	3	4	5	6	7
Eqn. of Time.	3m. 34s. sub.	3m. 16s. sub.	2m. 58s. sub.	2m. 41s. sub.	2m. 23s. sub.	2m. 6s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	23.12.49	23. 8.54	23. 4.58	23. 1. 2.	22.57. 6	22.53.10
2	23.17.41	23.13.45	23. 9.49	23. 5.53	23. 1.57	22.58. 2
3	23.48. 9	23.44.13	23.40.17	23.36.21	23.32.25	23.28.29
4	0.17.15	0.13.19	0. 9.23	0. 5.27	0. 1. 31 23. 57. 35	23.53.39
*5	0.48. 4	0.44. 8	0.40.12	0.35.16	0.32.20	0.28.25
6†	1.14.29	1.10.33	1. 6.38	1. 2.42	0.58.46	0.54.50
7	1.27.31	1.23.35	1.19.39	1.15.44	1.11.48	1. 7.52
8	2.10. 5	2. 6. 9	2. 2.13	1.58.17	1.54.21	1.50.25
9	2.29. 7	2.25.11	2.21.15	2.17.19	2.13.23	2. 9.27
*10†	3.42.40	3.38.44	3.34.48	3.30.52	3.26.57	3.23. 1
*11	4.20.46	4.16.50	4.12.54	4. 8.58	4. 5. 2	4. 1. 6
*12	4.22.38	4.18.42	4.14.46	4.10.50	4. 6.54	4. 2.58
13	4.32. 0	4.28. 4	4.24. 8	4.20.12	4.16.16	4.12.20
*14	5. 2.12	4.58.16	4.54.20	4.50.24	4.46.29	4.42.33
*15	5.35.52	5.31.56	5.28. 1	5.24. 5	5.20. 9	5.16.13
*16	5.53.37	5.49.41	5.45.45	5.41.49	5.37.53	5.33.57
17	6.39.51	6.35.55	6.31.59	6.28. 3	6.24. 7	6.20.11
*18	6.46.19	6.42.23	6.38.28	6.34.32	6.30.36	6.26.40
19†	6.50.56	6.47. 1	6.43. 5	6.39. 9	6.35.13	6.31.17
*20	8.26.26	8.22.30	8.18.34	8.14.38	8.10.42	8. 6.46
21	8.34.49	8.30.53	8.26.57	8.23. 1	8.19. 5	8.15. 9
*22†	9.14.51	9.10.55	9. 6.59	9. 3. 3	8.59. 7	8.55.11
*23	10. 8.41	10. 4.45	10. 0.49	9.56.54	9.52.58	9.49. 2
24	10.55.36	10.51.40	10.47.45	10.43.49	10.39.53	10.35.57
*25	11.32.23	11.28.27	11.24.31	11.20.35	11.16.39	11.12.43
*26†	12.31.14	12.27.18	12.23.22	12.19.26	12.15.30	12.11.34
27	12.55.34	12.51.38	12.47.42	12.43.46	12.39.50	12.35.54
*28	13. 7. 1	13. 3. 5	12.59.10	12.55.14	12.51.18	12.47.22
*29	13.22.39	13.18.43	13.14.47	13.10.51	13. 6.56	13. 3. 0
*30	13.43. 7	13.39.11	13.35.15	13.31.19	13.27.23	13.23.27
31	14.22.34	14.18.38	14.14.42	14.10.46	14. 6.50	14. 2.54
32	14.41.58	14.38. 2	14.34. 6	14.30.11	14.26.15	14.22.19
33	14.50.27	14.46.31	14.42.35	14.38.39	14.34.43	14.30.48
*34†	15.33.36	15.29.40	15.25.44	15.21.48	15.17.52	15.13.56
35	16.21. 9	16.17.13	16.13.17	16. 9.21	16. 5.26	16. 1.30
36	16.41.15	16.37.19	16.33.24	16.29.28	16.25.32	16.21.36
37	17. 6.29	17. 2.33	16.58.37	16.54.41	16.50.45	16.46.49
*38	17.45. 2	17.41. 7	17.37.11	17.33.15	17.29.19	17.25.23
*39†	18.56.22	18.52.26	18.48.30	18.44.34	18.40.38	18.36.42
40	19.26.23	19.22.27	19.18.31	19.14.35	19.10.39	19. 6.43
*41	19.49.10	19.45.14	19.41.18	19.37.22	19.33.26	19.29.30
42	21.11.12	21. 7.16	21. 3.20	20.59.24	20.55.28	20.51.32
*43†	22. 1.42	21.57.46	21.53.50	21.49.54	21.45.58	21.42. 2
44†	22. 9.39	22. 5.43	22. 1.48	21.57.52	21.53.56	21.50. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longi-tude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 2	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.19	2. 8
36	0.22	2.24
40	0.24	2.40
44	0.27	2.56
48	0.29	3.12
52	0.32	3.28
56	0.34	3.44
60	0.36	4. 0
64	0.39	4.16
68	0.41	4.32
72	0.44	4.48
76	0.46	5. 4
80	0.49	5.20
84	0.51	5.36
88	0.53	5.52
92	0.56	6. 8
96	0.58	6.24
100	1. 1	6.40
104	1. 3	6.56
108	1. 5	7.12
112	1. 8	7.28
116	1.10	7.44
120	1.13	8. 0
124	1.15	8.16
128	1.18	8.32
132	1.20	8.48
136	1.22	9. 4
140	1.25	9.20
144	1.27	9.36
148	1.30	9.52
152	1.32	10. 8
156	1.35	10.24
160	1.37	10.40
164	1.39	10.56
168	1.42	11.12
172	1.44	11.28
176	1.47	11.44
180	1.49	12. 0

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

APRIL, 1844.

Day.	8	9	10	11	12	13	14	15
Eqn. of Time.	1m. 49s. sub.	1m. 32s. sub.	1m. 15s. sub.	0m. 59s. sub.	0m. 43s. sub.	0m. 28s. sub.	0m. 12s. sub.	0m, 3s. sub. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	22.49.14	22.45.18	22.41.22	22.37.26	22.33.30	22.29.35	22.25.39	22.21.43
2	22.54. 6	22.50.10	22.46.14	22.42.18	22.38.22	22.34.26	22.30.30	22.26.34
3	23.24.33	23.20.38	23.16.42	23.12.46	23. 8.50	23. 4.54	23. 0.58	22.57. 2
4	23.49.43	23.45.48	23.41.52	23.37.56	23.34. 0	23.30. 4	23.26. 8	23.22.12
*5	0.24.29	0.20.33	0.16.37	0.12.41	0. 8.45	0. 4.49	0. 0. 58 23. 56. 57	23.53. 1
6†	0.50.54	0.46.58	0.43. 2	0.39. 6	0.35.10	0.31.14	0.27.19	0.23.23
7	1. 3.56	1. 0. 0	0.56. 4	0.52. 8	0.48.12	0.44.16	0.40.20	0.36.25
8	1.46.29	1.42.33	1.38.37	1.34.42	1.30.46	1.26.50	1.22.54	1.18.58
9	2. 5.31	2. 1.35	1.57.39	1.53.43	1.49.48	1.45.52	1.41.56	1.38. 0
*10†	3.19. 5	3.15. 9	3.11.13	3. 7.17	3. 3.21	2.59.25	2.55.29	2.51.33
*11	3.57.10	3.53.14	3.49.19	3.45.23	3.41.27	3.37.31	3.33.35	3.29.39
*12	3.59. 2	3.55. 6	3.51.10	3.47.14	3.43.19	3.39.23	3.35.27	3.31.31
13	4. 8.24	4. 4.28	4. 0.32	3.56.36	3 52.41	3.48.45	3.44.49	3.40.53
*14	4.38.37	4.34.41	4.30 45	4.26.49	4.22.53	4.18.57	4.15. 1	4.11. 5
*15	5.12.17	5. 8.21	5. 4.25	5. 0.29	4.56.33	4.52.37	4.48.42	4.44.46
*16	5.30. 1	5.26. 5	5.22. 9	5.18.13	5.14.18	5.10.22	5. 6.26	5. 2.30
17	6.16.15	6 12.20	6. 8.24	6. 4.28	6. 0.32	5.56.36	5.52.40	5.48.44
*18	6.22.44	6.18.48	6.14.52	6.10.56	6. 7. 0	6. 3. 4	5.59. 9	5.55.13
19†	6.27.21	6.23.25	6.19.29	6.15.33	6.11.37	6. 7.42	6. 3.46	5.59.50
*20	8. 2.50	7.58.54	7.54.58	7.51. 2	7.47. 7	7.43.11	7.39.15	7.35.19
21	8.11.13	8. 7.18	8. 3.22	7.59.26	7.55.30	7.51.34	7.47.38	7.43.42
*22†	8.51.15	8.47.19	8.43.23	8.39.28	8.35.32	8.31.36	8.27.40	8.23.44
*23	9.45. 6	9.41.10	9.37.14	9.33.18	9.29.22	9.25.26	9.21.30	9.17.35
24	10.32. 1	10.28. 5	10.24. 9	10.20.13	10.16.17	10.12.21	10. 8.26	10. 4.30
*25	11. 8.47	11. 4.51	11. 0.56	10.57. 0	10.53. 4	10.49. 8	10.45.12	10.41.16
*26†	12. 7.38	12. 3.42	11.59.46	11.55.51	11.51.55	11.47.59	11.44. 3	11.40. 7
27	12.31.58	12.28. 3	12.24. 7	12.20.11	12.16.15	12.12.19	12. 8.23	12. 4.27
*28	12.43.26	12.39.30	12.35.34	12.31.38	12.27.42	12.23.46	12.19.51	12.15.55
*29	12.59. 4	12.55. 8	12.51.12	12.47.16	12.43.20	12.39.24	12.35.28	12.31.32
*30	13.19.31	13.15.36	13.11.40	13. 7.44	13. 3.48	12.59.52	12.55.56	12.52. 0
31	13.58.58	13.55. 2	13.51. 6	13.47.10	13.43.15	13.39.19	13.35.23	13.31.27
32	14.18.23	14.14.27	14.10.31	14. 6.35	14. 2.39	13.58.43	13.54.47	13.50.52
33	14.26.52	14.22.56	14.19. 0	14.15. 4	14.11. 8	14. 7.12	14. 3.16	13.59.20
*34†	15.10. 0	15. 6. 5	15. 2. 9	14.58.13	14.54.17	14.50.21	14.46.25	14.42.29
35	15.57.34	15.53.38	15.49.42	15.45.46	15.41.50	15.37.54	15.33.58	15.30. 2
36	16.17.40	16.13.44	16. 9.48	16. 5.52	16. 1.56	15.58. 0	15.54. 5	15.50. 9
37	16.42.53	16.38.57	16.35. 1	16.31. 6	16.27.10	16.23.14	16.19.18	16.15.22
*38	17.21.27	17.17.31	17.13.35	17. 9.39	17. 5.43	17. 1.48	16.57.52	16.53.56
*39†	18.32.46	18.28.50	18.24.55	18.20.59	18.17. 3	18.13. 7	18. 9.11	18. 5.15
40	19. 2.47	18.58.51	18.54.56	18.51. 0	18.47. 4	18.43. 8	18.39.12	18.35.16
*41	19.25.34	19.21.38	19.17.42	19.13.47	19. 9.51	19. 5.55	19. 1.59	18.58. 3
42	20.47.36	20.43.40	20.39.44	20.35.48	20.31.53	20.27.57	20.24. 1	20.20. 5
*43†	21.38. 7	21.34.11	21.30.15	21.26.19	21.22.23	21.18.27	21.14.31	21.10.35
44†	21.46. 4	21.42. 8	21.38.12	21.34.16	21.30.20	21.26.24	21.22.29	21.18.33

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

APRIL, 1844.

Day.	16	17	18	19	20	21
Eqn. of Time.	0m. 17s. add.	0m. 31s. add.	0m. 45s. add.	0m. 58s. add.	1m. 11s. add.	1m. 24s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	22.17.47	22.13.51	22. 9.55	22. 5.59	22. 2. 3	21.58. 7
2	22.22.38	22.18.43	22.14.47	22.10.51	22. 6.55	22. 2.59
3	22.53. 6	22.49.10	22.45.14	22.41.19	22.37.23	22.33.27
4	23.18.16	23.14.20	23.10.24	23. 6.29	23. 2.33	22.58.37
*5	23.49. 6	23.45.10	23.41.14	23.37.18	23.33.22	23.29.26
6†	0.19.27	0.15.31	0.11.35	0. 7.39	0. 3. 43 23. 59. 47	23.55.51
7	0.32.29	0.28.33	0.24.37	0.20.41	0.16.45	0.12.49
8	1.15. 2	1.11. 6	1. 7.10	1. 3.14	0.59.18	0.55.23
9	1.34. 4	1.30. 8	1.26.12	1.22.16	1.18.20	1.14.24
*10†	2.47.38	2.43.42	2.39.46	2.35.50	2.31.54	2.27.58
*11	3.25.43	3.21.47	3.17.51	3.13.55	3.10. 0	3. 6. 4
*12	3.27.35	3.23.39	3.19.43	3.15.47	3.11.51	3. 7.55
13	3.36.57	3.33. 1	3.29. 5	3.25. 9	3.21.13	3.17.17
*14	4. 7.10	4. 3.14	3.59.18	3.55.22	3.51.26	3.47.30
*15	4.40.50	4.36.54	4.32.58	4.29. 2	4.25. 6	4.21.10
*16	4.58.34	4.54.38	4.50.42	4.46.46	4.42.50	4.38.54
17	5.44.48	5.40.52	5.36.56	5.33. 1	5.29. 5	5.25. 9
*18	5.51.17	5.47.21	5.43.25	5.39.29	5.35.33	5.31.37
19†	5.55.54	5.51.58	5.48. 2	5.44. 6	5.40.10	5.36.14
*20	7.31.23	7.27.27	7.23.31	7.19.35	7.15.39	7.11.43
21	7.39.46	7.35.50	7.31.54	7.27.59	7.24. 3	7.20. 7
*22†	8.19.48	8.15.52	8.11.56	8. 8. 0	8. 4. 4	8. 0. 9
*23	9.13.39	9. 9.43	9. 5.47	9. 1.51	8.57.55	8.53.59
24	10. 0.34	9.56.38	9.52.42	9.48.46	9.44.50	9.40.54
*25	10.37.20	10.33.24	10.29.28	10.25.32	10.21.37	10.17.41
*26†	11.36.11	11.32.15	11.28.19	11.24.23	11.20.27	11.16.32
27	12. 0.31	11.56.35	11.52.39	11.48.44	11.44.48	11.40.52
*28	12.11.59	12. 8. 3	12. 4. 7	12. 0.11	11.56.15	11.52.19
*29	12.27.37	12.23.41	12.19.45	12.15.49	12.11.53	12. 7.57
*30	12.48. 4	12.44. 8	12.40.12	12.36.17	12.32.21	12.28.25
31	13.27.31	13.23.35	13.19.39	13.15.43	13.11.47	13. 7.51
32	13.46.56	13.43. 0	13.39. 4	13.35. 8	13.31.12	13.27.16
33	13.55.24	13.51.29	13.47.33	13.43.37	13.39.41	13.35.45
*34†	14.38.33	14.34.37	14.30.41	14.26.46	14.22.50	14.18.54
35	15.26. 7	15.22.11	15.18.15	15.14.19	15.10.23	15. 6.27
36	15.46.13	15.42.17	15.38.21	15.34.25	15.30.29	15.26.33
37	16.11.26	16. 7.30	16. 3.34	15.59.38	15.55.42	15.51.47
*38	16.50. 0	16.46. 4	16.42. 8	16.38.12	16.34.16	16.30.20
*39†	18. 1.19	17.57.23	17.53.27	17.49.31	17.45.36	17.41.40
40	18.31.20	18.27.24	18.23.28	18.19.32	18.15.37	18.11.41
*41	18.54. 7	18.50.11	18.46.15	18.42.19	18.38.23	18.34.28
42	20.16. 9	20.12.13	20. 8.17	20. 4.21	20. 0.25	19.56.29
*43†	21. 6.39	21. 2.43	20.58.48	20.54.52	20.50.56	20.47. 0
44†	21.14.37	21.10.41	21. 6.45	21. 2.49	20.58.53	20.54.57

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.20	2. 8
36	0.22	2.24
40	0.25	2.40
44	0.27	2,56
48	0.30	3.12
52	0.32	3.28
56	0.35	3.44
60	0.37	4. 0
64	0.39	4.16
68	0.42	4.32
72	0.44	4.48
76	0.47	5. 4
80	0.49	5.20
84	0.52	5.36
88	0.54	5.52
92	0.57	6. 8
96	0.59	6.24
100	1. 1	6.40
104	1. 4	6.56
108	1. 6	7.12
112	1. 9	7.28
116	1.11	7.44
120	1.14	8. 0
124	1.16	8.16
128	1.19	8.32
132	1.21	8.48
136	1.24	9. 4
140	1.26	9.20
144	1.28	9.36
148	1.31	9.52
152	1.33	10. 8
156	1.36	10.24
160	1.38	10.40
164	1.41	10.56
168	1.43	11.12
172	1.46	11.28
176	1.48	11.44
180	1.51	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

APRIL, 1844.

Day.	22	23	24	25	26	27	28	29
Eqn. of Time.	1m. 36s. add.	1m. 48s. add.	1m. 59s. add.	2m. 10s. add.	2m. 20s. add.	2m. 30s. add.	2m. 39s. add.	2m. 48s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	21.54.11	21.50.16	21.46.20	21.42.24	21.38.28	21.34.32	21.30.36	21.26.40
2	21.59. 3	21 55. 7	21.51.11	21.47.15	21.43.19	21.39.24	21.35.28	21.31.32
3	22.29.31	22.25.35	22.21.39	22.17.43	22.13.47	22. 9.51	22. 5.55	22. 2. 0
4	22.54.41	22.50.45	22.46.49	22.42.53	22.38.57	22.35. 1	22.31. 5	22.27.10
*5	23.25.30	23.21.34	23.17.38	23.13.42	23. 9.47	23. 5.51	23. 1.55	22.57.59
6†	23.51.55	23.48. 0	23.44. 4	23.40. 8	23.36.12	23.32.16	23.28.20	23.24.24
7	0. 8.53	0. 4.57	0. 1. 1 23. 57. 6	23.53.10	23.49.14	23.45.18	23.41.22	23.37.26
8	0.51.27	0.47.31	0.43.35	0.39.39	0.35.43	0.31.47	0.27.51	0.23.55
9	1.10.29	1. 6.33	1. 2.37	0.58.41	0.54.45	0.50.49	0.46.53	0.42.57
*10†	2.24. 2	2.20. 6	2.16.10	2.12.14	2. 8.19	2. 4.23	2. 0.27	1.56.31
*11	3. 2. 8	2.58.12	2.54.16	2.50.20	2.46.24	2.42.28	2.38.32	2.34.36
*12	3. 4. 0	3. 0. 4	2.56. 8	2.52.12	2.48.16	2.44.20	2.40.24	2.36.28
13	3.13.22	3. 9.26	3. 5.30	3. 1.34	2.57.38	2.53.42	2.49.46	2.45.50
*14	3.43.34	3.39.38	3.35.42	3.31.46	3.27.51	3.23.55	3.19.59	3.16. 3
*15	4.17.14	4.13.18	4. 9.23	4. 5.27	4. 1.31	3.57.35	3.53.39	3.49.43
*16	4.34.59	4.31. 3	4.27. 7	4.23.11	4.19.15	4.15.19	4.11.23	4. 7.27
17	5.21.13	5.17.17	5.13.21	5. 9.25	5. 5.29	5. 1.33	4.57.37	4.53.42
*18	5.27.41	5.23 45	5.19.50	5.15.54	5.11.58	5. 8. 2	5. 4. 6	5. 0.10
19†	5.32.18	5.28.23	5.24.27	5.20.31	5.16.35	5.12.39	5. 8.43	5. 4.47
*20	7. 7.48	7. 3.52	6.59.56	6.56. 0	6.52. 4	6.48. 8	6.44.12	6.40.16
21	7.16.11	7.12.15	7. 8.19	7. 4.23	7. 0.27	6.56.31	6.52.35	6.48.40
*22†	7.56.13	7.52.17	7.48.21	7.44.25	7.40.29	7.36.33	7.32.37	7.28.41
*23	8.50. 3	8.46. 7	8.42.11	8.38.16	8.34.20	8.30.24	8.26.28	8.22.32
24	9.36.58	9.33. 2	9.29. 7	9.25.11	9.21.15	9.17.19	9.13.23	9. 9.27
*25	10.13.45	10. 9.49	10. 5.53	10. 1.57	9.58. 1	9.54. 5	9.50. 9	9.46.13
*26†	11.12.36	11. 8.40	11. 4.44	11. 0.48	10.56.52	10.52.56	10.49. 0	10.45. 4
27	11.36.56	11.33. 0	11.29. 4	11.25. 8	11.21.12	11.17.16	11.13.20	11. 9.25
*28	11.48.23	11.44.27	11.40.32	11.36.36	11.32.40	11.28.44	11.24.48	11.20.52
*29	12. 4. 1	12. 0. 5	11.56. 9	11.52.13	11.48.18	11.44.22	11.40.26	11.36.30
*30	12.24.29	12.20.33	12.16.37	12.12.41	12. 8.45	12. 4.49	12. 0.53	11.56.58
31	13. 3.56	13. 0. 0	12.56. 4	12.52. 8	12.48.12	12.44.16	12.40.20	12.36.24
32	13.23.20	13.19.24	13.15.28	13.11.33	13. 7.37	13. 3.41	12.59.45	12.55.49
33	13.31.49	13.27.53	13.23.57	13.20. 1	13.16. 5	13.12.10	13. 8.14	13. 4.18
*34†	14.14.58	14.11. 2	14. 7. 6	14. 3.10	13.59.14	13.55.18	13.51.22	13.47.27
35	15. 2.31	14.58.35	14.54.39	14.50.43	14.46.48	14.42.52	14.38.56	14.35. 0
36	15.22.37	15.18.41	15.14.46	15.10.50	15. 6.54	15. 2.58	14.59. 2	14.55. 6
37	15.47.51	15.43.55	15.39.59	15.36. 3	15.32. 7	15.28.11	15.24.15	15.20.19
*38	16.26.24	16.22.29	16.18.33	16.14.37	16.10.41	16. 6.45	16. 2.49	15.58.53
*39†	17.37.44	17.33.48	17.29.52	17.25.56	17.22. 0	17.18. 4	17.14. 8	17.10.12
40	18. 7.45	18. 3.49	17.59.53	17.55.57	17.52. 1	17.48. 5	17.44. 9	17.40.13
*41	18.30.32	18.26.36	18.22.40	18.18.44	18.14.48	18.10.52	18. 6.56	18. 3. 0
42	19.52.34	19.48.38	19.44.42	19.40.46	19.36.50	19.32.54	19.28.58	19.25. 2
*43†	20.43. 4	20.39. 8	20.35.12	20.31.16	20.27.20	20.23.24	20.19.29	20.15.33
44†	20.51. 1	20.47. 5	20.43.10	20.39.14	20.35.18	20.31.22	20.27.26	20.23.30

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

APRIL. 1844. MAY.

Day.	30	1	2	3	4	5
Eqn. of Time.	2m. 56s. add.	3m. 4s. add.	3m. 11s. add.	3m. 18s. add.	3m. 24s. add.	3m. 30s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	21.22.44	21.18.48	21.14.52	21.10.57	21. 7. 1	21. 3. 5
2	21.27.36	21.23.40	21.19.44	21.15.48	21.11.52	21. 7.56
3	21.58. 4	21.54. 8	21.50.12	21.46.16	21.42.20	21.38.24
4	22.23.14	22.19.18	22.15.22	22.11.26	22. 7.30	22. 3.34
*5	22.54. 3	22.50. 7	22.46.11	22.42.15	22.38.19	22.34.23
6†	23.20.28	23.16.32	23.12.36	23. 8.41	23. 4.45	23. 0.49
7	23.33.30	23.29.34	23.25.38	23.21.42	23.17.47	23.13.51
8	0.19.59	0.16. 4	0.12. 8	0. 8.12	0. 4.16	0. 0. 20 23. 56. 24
9	0.39. 1	0.35. 5	0.31.10	0.27.14	0.23.18	0.19.22
*10†	1.52.35	1.48.39	1.44.43	1.40.47	1.36.51	1.32.55
*11	2.30.41	2.26.45	2.22.49	2.18.53	2.14.57	2.11. 1
*12	2.32.32	2.28 36	2.24.41	2.20.45	2.16.49	2.12.53
13	2.41.54	2.37.58	2.34. 3	2.30. 7	2.26.11	2.22.15
*14	3.12. 7	3. 8.11	3. 4.15	3. 0.19	2.56.23	2.52.27
*15	3.45.47	3.41.51	3.37.55	3.33.59	3.30. 4	3.26. 8
*16	4. 3.31	3.59.35	3.55.40	3.51.44	3.47.48	3.43.52
17	4.49.46	4.45.50	4.41.54	4.37.58	4.33. 2	4.29. 6
*18	4.56.14	4.52.18	4.48.22	4.44.26	4.40.31	4.36.35
19†	5. 0.51	4.56.55	4.52.59	4.49. 4	4.45. 8	4.41.12
*20	6.36.20	6.32.24	6.28.29	6.24.33	6.20.37	6.16.41
21	6.44.44	6.40.48	6.36.52	6.32.56	6.29. 0	6.25. 4
*22†	7.24.45	7.20.50	7.16.54	7.12.58	7. 9. 2	7. 5. 6
*23	8.18.36	8.14.40	8.10.44	8. 6.48	8. 2.52	7.58.57
24	9. 5.31	9. 1.35	8.57.39	8.53.43	8.49.48	8.45.52
*25	9.42.18	9.38.22	9.34.26	9.30.30	9.26.34	9.22.38
*26†	10.41. 8	10.37.13	10.33.17	10.29.21	10.25.25	10.21.29
27	11. 5.29	11. 1.33	10.57.37	10.53.41	10.49.45	10.45.49
*28	11.16.56	11.13. 0	11. 9. 4	11. 5. 8	11. 1.13	10.57.17
*29	11.32.34	11.28.38	11.24.42	11.20.46	11.16.50	11.12.54
*30	11.53. 2	11.49. 6	11.45.10	11.41.14	11.37.18	11.33.22
31	12.32.28	12.28.32	12.24.37	12.20.41	12.16.45	12.12.49
32	12.51.53	12.47.57	12.44. 1	12.40. 5	12.36. 9	12.32.14
33	13. 0.22	12.56.26	12.52.30	12.48.34	12.44.38	12.40.42
*34†	13.43.31	13.39.35	13.35.39	13.31.43	13.27.47	13.23.51
35	14.31. 4	14.27. 8	14.23.12	14.19.16	14.15.20	14.11.24
36	14.51.10	14.47.14	14.43.18	14.39.22	14.35.27	14.31.31
37	15.16.23	15.12.28	15. 8.32	15. 4.36	15. 0.40	14.56.44
*38	15.54.57	15.51. 1	15.47. 5	15.43.10	15.39.14	15.35.18
*39†	17. 6.17	17. 2.21	16.58.25	16.54.29	16.50.33	16.46.37
40	17.36.18	17.32.22	17.28.26	17.24.30	17.20.34	17.16.38
*41	17.59. 4	17.55. 9	17.51.13	17.47.17	17.43.21	17.39.25
42	19.21. 6	19.17.10	19.13.15	19. 9.19	19. 5.23	19. 1.27
*43†	20.11.37	20. 7.41	20. 3.45	19.59.49	19.55.53	19.51.57
44†	20.19.34	20.15.38	20.11.42	20. 7.46	20. 3.51	19.59.55

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.13	1.20
24	0.15	1.36
28	0.18	1.52
32	0.20	2. 8
36	0.23	2.24
40	0.25	2.40
44	0.28	2.56
48	0.31	3.12
52	0.33	3.28
56	0.36	3.44
60	0.38	4. 0
64	0.41	4.16
68	0.43	4.32
72	0.46	4.48
76	0.48	5. 4
80	0.51	5.20
84	0.54	5.36
88	0.56	5.52
92	0.59	6. 8
96	1. 1	6.24
100	1. 4	6.40
104	1. 6	6.56
108	1. 9	7.12
112	1.11	7.28
116	1.14	7.44
120	1.16	8. 0
124	1.19	8.16
128	1.21	8.32
132	1.24	8.48
136	1.27	9. 4
140	1.29	9.20
144	1.32	9.36
148	1.34	9.52
152	1.37	10. 8
156	1.39	10.24
160	1.42	10.40
164	1.44	10.56
168	1.47	11.12
172	1.49	11.28
176	1.52	11.44
180	1.55	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **FIXED STARS** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MAY, 1844.

Day.	6	7	8	9	10	11	12	13
Eqn. of Time.	3m. 35s. add.	3m. 39s. add.	3m. 43s. add.	3m. 46s. add.	3m. 49s. add.	3m. 51s. add.	3m. 53s. add.	3m. 54s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	20 59. 9	20.55.13	20.51.17	20.47.21	20.43.25	20.39.29	20.35.33	20.31.38
2	21. 4. 0	21. 0. 5	20.56. 9	20.52.13	20.48.17	20.44.21	20.40.25	20.36.29
3	21.34.28	21.30.32	21.26.36	21.22.41	21.18.45	21.14.49	21.10.53	21. 6.57
4	21.59.38	21.55.42	21.51.46	21.47.51	21.43.55	21.39.59	21.36. 3	21.32. 7
*5	22.30.28	22.26.32	22.22.36	22.18.40	22.14.44	22.10.48	22. 6.52	22. 2.56
6†	22.56.53	22.52.57	22 49. 1	22.45. 5	22.41. 9	22.37.13	22.33.17	22.29.22
7	23. 9.55	23. 5.59	23. 2. 3	22.58. 7	22.54.11	22.50.15	22.46.19	22.42.23
8	23.52.28	23.48.32	23.44.36	23.40.40	23.36.45	23.32.49	23.28.53	23.24.57
9	0.15.26	0.11.30	0. 7.34	{ 0. 3. 38 { 23. 59. 42	23.55.46	23.51.51	23.47.55	23.43.59
*10†	1.29. 0	1.25. 4	1.21. 8	1.17.12	1.13.16	1. 9.20	1. 5.24	1. 1.28
*11	2. 7. 5	2. 3. 9	1.59.13	1.55.17	1.51.22	1.47.26	1.43.30	1.39.34
*12	2. 8.57	2. 5. 1	2. 1. 5	1.57. 9	1.53.13	1.49.17	1.45.22	1.41.26
13	2.18.19	2.14.23	2.10.27	2. 6.31	2. 2.35	1.58.39	1.54.44	1.50.48
*14	2.48.32	2.44.36	2.40.40	2.36.44	2.32.48	2.28.52	2.24.56	2.21. 0
*15	3.22.12	3.18.16	3.14.20	3.10.24	3. 6.28	3. 2.32	2.58.36	2.54.40
*16	3.39.56	3.36. 0	3.32. 4	3.28. 8	3.24.12	3.20.16	3.16.21	3.12.25
17	4.26.10	4.22.14	4.18.18	4.14.23	4.10.27	4. 6.31	4. 2.35	3.58.39
*18	4.32.39	4.28.43	4.24.47	4.20.51	4.16.55	4.12.59	4. 9. 3	4. 5. 7
19†	4.37.16	4.33.20	4.29.24	4.25.28	4.21.32	4.17.36	4.13.40	4. 9.45
*20	6.12.45	6. 8.49	6. 4.53	6. 0.57	5.57. 1	5.53. 5	5.49.10	5.45.14
21	6.21. 8	6.17.12	6.13.16	6. 9.21	6. 5.25	6. 1.29	5.57.33	5.53.37
*22†	7. 1.10	6.57.14	6.53.18	6.49.22	6.45.26	6.41.31	6.37.35	6.33.39
*23	7.55. 1	7.51. 5	7.47. 9	7.43.13	7.39.17	7.35.21	7.31.25	7.27.29
24	8.41.56	8.38. 0	8.34. 4	8.30. 8	8.26.12	8.22.16	8.18.20	8.14.24
*25	9.18.42	9.14.46	9.10.50	9. 6.54	9. 2.59	8.59. 3	8.55. 7	8.51.11
*26†	10.17.33	10.13.37	10. 9.41	10. 5.45	10. 1.49	9.57.54	9.53.58	9.50. 2
27	10.41.53	10.37.57	10.34. 1	10.30. 6	10.26.10	10.22.14	10.18.18	10.14.22
*28	10.53.21	10.49.25	10.46.29	10.41.33	10.37.37	10.33.41	10.29.45	10.25.49
*29	11. 8.59	11. 5. 3	11. 1. 7	10.57.11	10.53.15	10.49.19	10.45.23	10.41.27
*30	11.29.26	11.25.30	11.21.34	11.17.39	11.13.43	11. 9.47	11. 5.51	11. 1.55
31	12. 8.53	12. 4.57	12. 1. 1	11.57. 5	11.53. 9	11.49.13	11.45.18	11.41.22
32	12.28.18	12.24.22	12.20.26	12.16.30	12.12.34	12. 8.38	12. 4.42	12. 0.46
33	12.36.46	12.32.51	12.28.55	12.24.59	12.21. 3	12.17. 7	12.13.11	12. 9.15
*34†	13.19.55	13.15.59	13.12. 3	13. 8. 8	13. 4.12	13. 0.16	12.56.20	12.52.24
35	14. 7.29	14. 3.33	13.59.37	13.55.41	13.51.45	13.47.49	13.43.53	13.39.57
36	14.27.35	14.23.39	14.19.43	14.15.47	14.11.51	14. 7.55	14. 3.59	14. 0. 3
37	14.52.48	14.48.52	14.44.56	14.41. 0	14.37. 4	14.33. 9	14.29.13	14.25.17
*38	15.31.22	15.27.26	15.23.30	15.19.34	15.15.38	15.11.42	15. 7.46	15. 3.51
*39†	16.42.41	16.38.45	16.34.49	16.30.53	16.26.58	16.23. 2	16.19. 6	16.15.10
40	17.12.42	17. 8.46	17. 4.50	17. 0.54	16.56.59	16.53. 3	16.49. 7	16.45.11
*41	17.35.29	17.31.33	17.27.37	17.23.41	17.19.45	17.15.50	17.11.54	17. 7.58
42	18.57.31	18.53.35	18.49.39	18.45.43	18.41.47	18.37.51	18.33.56	18.30. 0
*43†	19.48. 1	19.44. 5	19.40.10	19.36.14	19.32.18	19.28.22	19.24.26	19.20.30
44†	19.55.59	19.52. 3	19.48. 7	19.44.11	19.40.15	19.36.19	19.32.23	19.28.27

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MAY, 1844.

Day.	14	15	16	17	18	19
Eqn. of Time.	3m. 54s. add.	3m. 53s. add.	3m. 53s. add.	3m. 51s. add.	3m. 49s. add.	3m. 47s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	20.27.42	20.23.46	20.19.50	20.15.54	20.11.58	20. 8. 2
2	20.32.33	20.28.37	20.24.41	20.20.46	20.16.50	20.12.54
3	21. 3. 1	20.59. 5	20.55. 9	20.51.13	20.47.17	20.43.22
4	21.28.11	21.24.15	21.20.19	21.16.23	21.12.27	21. 8.32
*5	21.59. 0	21.55. 4	21.51. 9	21.47.13	21.43.17	21.39.21
6†	22.25.26	22.21.30	22.17.34	22.13.38	22. 9.42	22. 5.46
7	22.38.28	22.34.32	22.30.36	22.26.40	22.22.44	22.18.48
8	23.21. 1	23.17. 5	23.13. 9	23. 9.13	23. 5.17	23. 1.21
9	23.40. 3	23.36. 7	23.32.11	23.28.15	23.24.19	23.20.23
*10†	0.57.32	0.53.36	0.49.41	0.45.45	0.41.49	0.37.53
*11	1.35.38	1.31.42	1.27.46	1.23.50	1.19.54	1.15.58
*12	1.37.30	1.33.34	1.29.38	1.25.42	1.21.46	1.17.50
13	1.46.52	1.42.56	1.39. 0	1.35. 4	1.31. 8	1.27.12
*14	2.17. 4	2.13. 8	2. 9.13	2. 5.17	2. 1.21	1.57.25
*15	2.50.45	2.46.49	2.42.53	2.38.57	2.35. 1	2.31. 5
*16	3. 8.29	3. 4.33	3. 0.37	2.56.41	2.52.45	2.48.49
17	3.54.43	3.50.47	3.46.51	3.42.55	3.38.59	3.35. 4
*18	4. 1.12	3.57.16	3.53.20	3.49.24	3.45.28	3.41.32
19†	4. 5.49	4. 1.53	3.57.57	3.54. 1	3.50. 5	3.46. 9
*20	5.41.18	5.37.22	5.33.26	5.29.30	5.25.34	5.21.38
21	5.49.41	5.45.45	5.41.49	5.37.53	5.33.57	5.30. 2
*22†	6.29.43	6.25.47	6.21.51	6.17.55	6.13.59	6.10. 3
*23	7.23.33	7.19.38	7.15.42	7.11.46	7. 7.50	7. 3.54
24	8.10.29	8. 6.33	8. 2.37	7.58.41	7.54.45	7.50.49
*25	8.47.15	8.43.19	8.39.23	8.35.27	8.31.31	8.27.35
*26†	9.46. 6	9.42.10	9.38.14	9.34.18	9.30.22	9.26.26
27	10.10.26	10. 6.30	10. 2.34	9.58.38	9.54.42	9.50.47
*28	10.21.54	10.17.58	10.14. 2	10.10. 6	10. 6.10	10. 2.14
*29	10.37.31	10.33.35	10.29.40	10.25.44	10.21.48	10.17.52
*30	10.57.59	10.54. 3	10.50. 7	10.46.11	10.42.15	10.38.20
31	11.37.26	11.33.30	11.29 34	11.25.38	11.21.42	11.17.46
32	11.56.50	11.52.55	11.48.59	11.45. 3	11.41. 7	11.37.11
33	12. 5.19	12. 1.23	11.57.27	11.53.32	11.49.36	11.45.40
*34†	12.48.28	12.44.32	12.40.36	12.36.40	12.32.44	12.28.49
35	13.36. 1	13.32. 5	13.28.10	13.24.14	13.20.18	13.16.22
36	13.56. 8	13.52.12	13.48.16	13.44.20	13.40.24	13.36.28
37	14.21.21	14.17.25	14.13.29	14. 9.33	14. 5.37	14. 1.41
*38	14.59.55	14.55.59	14.52. 3	14.48. 7	14.44.11	14.40.15
*39†	16.11.14	16. 7.18	16. 3.22	15.59.26	15.55.30	15.51.34
40	16.41.15	16.37.19	16.33.23	16.29.27	16.25.31	16.21.35
*41	17. 4. 2	17. 0. 6	16.56.10	16.52.14	16.48.18	16.44.22
42	18.26. 4	18.22. 8	18.18.12	18.14.16	18.10.20	18. 6.24
*43†	19.16.34	19.12.38	19. 8.42	19. 4.46	19. 0.51	18.56.55
44†	19.24.32	19.20.36	19.16.40	19.12.44	19. 8.48	19. 4.52

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.13	1.20
24	0.16	1.36
28	0.18	1.52
32	0.21	2. 8
36	0.24	2.24
40	0.26	2.40
44	0.29	2.56
48	0.31	3.12
52	0.34	3.28
56	0.37	3.44
60	0.39	4. 0
64	0.42	4.16
68	0.44	4.32
72	0.47	4.48
76	0.50	5. 4
80	0.52	5.20
84	0.55	5.36
88	0.57	5.52
92	1. 0	6. 8
96	1. 3	6.24
100	1. 5	6.40
104	1. 8	6.56
108	1.11	7.12
112	1.13	7.28
116	1.16	7.44
120	1.18	8. 0
124	1.21	8.16
128	1.24	8.32
132	1.26	8.48
136	1.29	9. 4
140	1.31	9.20
144	1.34	9.36
148	1.37	9.52
152	1.39	10. 8
156	1.43	10.24
160	1.44	10.40
164	1.47	10.56
168	1.50	11.12
172	1.52	11.28
176	1.55	11.44
180	1.58	12. 0

TABLE B.

Approximations, expressed in **MEAN TIME** of the **CULMINATIONS** of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MAY, 1844.

Day.	20	21	22	23	24	25	26	27
Eqn. of Time.	3m. 44s. add.	3m. 40s. add.	3m. 36s. add.	3m. 31s. add.	3m. 26s. add.	3m. 20s. add.	3m. 14s. add.	3m. 8s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	20. 4. 6	20. 0.10	19.56.14	19.52.19	19.48.23	19.44.27	19.40.31	19.36.35
2	20. 8.58	20. 5. 2	20. 1. 6	19.57.10	19.53.14	19.49.18	19.45.22	19.41.27
3	20.39.26	20.35.30	20.31.34	20.27.38	20.23.42	20.19.46	20.15.50	20.11.54
4	21. 4.36	21. 0.40	20.56.44	20.52.48	20.48.52	20.44.56	20.41. 0	20.37. 4
*5	21.35.25	21.31.29	21.27.33	21.23.37	21.19.41	21.15.45	21.11.50	21. 7.54
6†	22. 1.50	21.57.54	21.53.58	21.50. 3	21.46. 7	21.42.11	21.38.15	21.34.19
7	22.14.52	22.10.56	22. 7. 0	22. 3. 4	21.59. 9	21.55.13	21.51.17	21.47.21
8	22 57.26	22.53.30	22.49.34	22.45.38	22.41.42	22.37.46	22.33.50	22.29.54
9	23.16.27	23.12.32	23. 8.36	23. 4.40	23. 0.44	22.56.48	22.52.52	22.48.56
*10†	0.33.57	0.30. 1	0.26. 5	0.22. 9	0.18.13	0.14.17	0.10.22	0. 6.26
*11	1.12. 3	1. 8. 7	1. 4.11	1. 0.15	0.56.19	0.52.23	0.48.27	0.44.31
*12	1.13.54	1. 9.58	1. 6. 3	1. 2. 7	0.58.11	0.54.15	0.50.19	0.46.23
13	1.23.16	1.19.20	1.15.25	1.11.29	1. 7.33	1. 3.37	0.59.41	0.55.45
*14	1.53.29	1.49.33	1.45.37	1.41.41	1.37.45	1.33.49	1.29.54	1.25.58
*15	2.27. 9	2.23.13	2.19.17	2.15.21	2.11.26	2. 7.30	2. 3.34	1.59.38
*16	2.44.53	2.40.57	2.37. 2	2.33. 6	2.29.10	2.25.14	2.21.18	2.17.22
17	3.31. 8	3.27.12	3.23.16	3.19.20	3.15.24	3.11.28	3. 7.32	3. 3.36
*18	3.37.36	3.33.40	3.29.44	3.25.48	3.21.53	3.17.57	3.14. 1	3.10. 5
19†	3.42.13	3.38.17	3.34.21	3.30.26	3.26.30	3.22.34	3.18.38	3.14.42
*20	5.17.42	5.13.46	5. 9.51	5. 5.55	5. 1.59	4.58. 3	4.54. 7	4.50.11
21	5.26. 6	5.22.10	5.18.14	5.14.18	5.10.22	5. 6.26	5. 2.30	4.58.34
*22†	6. 6. 7	6. 2.12	5.58.16	5.54.20	5.50.24	5.46.28	5.42.32	5.38.36
*23	6.59.58	6.56. 2	6 52. 6	6.48.10	6.44.14	6.40.19	6.36.23	6.32.27
24	7.46.53	7.42.57	7.39. 1	7.35. 5	7.31.10	7.27.14	7.23.18	7.19.22
*25	8.23.40	8.19.44	8.15.48	8.11.52	8. 7.56	8. 4. 0	8. 0. 4	7.56. 8
*26†	9.22.30	9.18.35	9.14.39	9.10.43	9. 6.47	6. 2.51	8.58.55	8.54.59
27	9.46.51	9.42.55	9.38.59	9.35. 3	9.31. 7	9.27.11	9.23.15	9.19.19
*28	9.58.18	9.54.22	9.50.26	9.46.30	9.42.35	9.38.39	9.34.43	9.30.47
*29	10.13.56	10.10. 0	10. 6. 4	10. 2. 8	9.58.12	9.54.16	9.50.21	9.46.25
*30	10.34.24	10.30.28	10.26.32	10.22.36	10.18.40	10.14.44	10.10.48	10. 6.52
31	11.13.50	11. 9.54	11. 5.59	11. 2. 3	10.58. 7	10.54.11	10.50.15	10.46.19
32	11.33.15	11.29.19	11.25.23	11.21.27	11.17.31	11.13.36	11. 9.40	11. 5.44
33	11.41.44	11.37.48	11.33.52	11.29.56	11.26. 0	11.22. 4	11.18. 8	11.14.13
*34†	12.24.53	12.20.57	12.17. 1	12.13. 5	12. 9. 9	12. 5.13	12. 1.17	11.57.21
35	13.12.26	13. 8.30	13. 4.34	13. 0.38	12.56.42	12.52.46	12.48.51	12.44.55
36	13.32.32	13.28.36	13.24.40	13.20.44	13.16.49	13.12.53	13. 8.57	13. 5. 1
37	13.57.45	13.53.50	13.49.54	13.45.58	13.42. 2	13.38. 6	13.34.10	13.30.14
*38	14.36.19	14.32.23	14.28.27	14.24.32	14.20.36	14.16.40	14.12.44	14. 8.48
*39†	15.47.39	15.43.43	15.39.47	15.35.51	15.31.55	15.27.59	15.24. 3	15.20. 7
40	16.17.40	16.13.44	16. 9.48	16. 5.52	16. 1.56	15.58. 0	15.54. 4	15.50. 8
*41	16.40.26	16.36.31	16.32.35	16.28.39	16.24.43	16.20.47	16.16.51	16.12.55
42	18. 2.28	17.58.32	17.54.37	17.50.41	17.46.45	17.42.49	17.38.53	17.34.57
*43†	18.52.59	18.49. 3	18.45. 7	18.41.11	18.37.15	18.33.19	18.29.23	18.25.27
44†	19. 0.56	18.57. 0	18.53. 4	18.49. 8	18.45.13	18.41.17	18.37.21	18.33.25

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

MAY. 1844. JUNE.

Day.	28	29	30	31	1	2
Eqn. of Time.	3m. 1s. add.	2m. 53s. add.	2m. 45s. add.	2m. 37s. add.	2m. 28s. add.	2m. 19s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	19.32.39	19.28.43	19.24.47	19.20.51	19.16.55	19.13. 0
2	19.37.31	19.33.35	19.29.39	19.25.43	19.21.47	19.17.51
3	20. 7.58	20. 4. 3	20. 0. 7	19.56.11	19.52.15	19.48.19
4	20.33. 8	20.29.13	20.25.17	20.21.21	20.17.25	20.13.29
*5	21. 3.58	21. 0. 2	20.56. 6	20.52.10	20.48.14	20.44.18
6†	21.30.23	21.26.27	21.22.31	21.18.35	21.14.39	21.10.44
7	21.43.25	21.39.29	21.35.33	21.31.37	21.27.41	21.23.45
8	22.25.58	22.22. 2	22.18. 7	22.14.11	22.10.15	22. 6.19
9	22.45. 0	22.41. 4	22.37. 8	22.33.13	22.29.17	22.25.21
*10†	0. 2. 30 23. 58. 34	23.54.38	23.50.42	23.46.46	23.42.50	23.38.54
*11	0.40.35	0.36.39	0.32.44	0.28.47	0.24.52	0.20.56
*12	0.42.27	0.38.31	0.34.35	0.30.39	3.26.44	0.22.48
13	0.51.49	0.47.53	0.43.57	0.40. 1	0.36. 6	0.32.10
*14	1.22. 2	1.18. 6	1.14.10	1.10.14	1. 6.18	1. 2.22
*15	1.55.42	1.51.46	1.47.50	1.43.54	1.39.58	1.36. 2
*16	2.13.26	2. 9.30	2. 5.34	2. 1.38	1.57.43	1.53.47
17	2.59.40	2.55.45	2.51.49	2.47.53	2.43.57	2.40. 1
*18	3. 6. 9	3. 2.13	2.58.17	2.54.21	2.50.25	2.46.29
19†	3.10.46	3. 6.50	3. 2.54	2.58.58	2.55. 2	2.51. 7
*20	4.46.15	4.42.19	4.38.23	4.34.27	4.30.32	4.26.36
21	4.54.38	4.50.43	4.46.47	4.42.51	4.38.55	4.34.59
*22†	5.34.40	5.30.44	5.26.48	5.22.53	5.18.57	5.15. 1
*23	6.28.31	6.24.35	6.20.39	6.16.43	6.12.47	6. 8.51
24	7.15.26	7.11.30	7. 7.34	7. 3.38	6.59.42	6.55.46
*25	7.52.12	7.48.16	7.44.21	7.40.25	7.36.29	7.32.33
*26†	8.51. 3	8.47. 7	8.43.11	8.39.16	8.35.20	8.31.24
27	9.15.23	9.11.28	9. 7.32	9. 3.36	8.59.40	8.55.44
*28	9.26.51	9.22.55	9.18.59	9.15. 3	9.11. 7	9. 7.11
*29	9.42.29	9.38.33	9.34.37	9.30.41	9.26.45	9.22.49
*30	10. 3.56	9.59. 1	9.55. 5	9.51. 9	9.47.13	9.43.17
31	10.42.23	10.38.27	10.34.31	10.30.35	10.26.40	10.22.44
32	11. 1.48	10.57.52	10.53.56	10.50. 0	10.46. 4	10.42. 8
33	11.10.17	11. 6.21	11. 2.25	10.58.29	10.54.33	10.50.37
*34†	11.53.25	11.49.30	11.45.34	11.41.38	11.37.42	11.33.46
35	12.40.59	12.37. 3	12.33. 7	12.29.11	12.25.15	12.21.19
36	13. 1. 5	12.57. 9	12.53.13	12.49.17	12.45.21	12.41.25
37	13.26.18	13.22.22	13.18.26	13.14.31	13.10.35	13. 6.39
*38	14. 4.52	14. 0.56	13.57. 0	13.53. 4	13.49. 8	13.45.13
*39†	15.16.11	15.12.15	15. 8.20	15. 4.24	15. 0.28	14.56.32
40	15.46.12	15.42.16	15.38.21	15.34.25	15.30.29	15.26.33
*41	16. 8.59	16. 5. 3	16. 1. 7	15.57.12	15.53.16	15.49.20
42	17.31. 1	17.27. 5	17.23. 9	17.19.13	17.15.18	17.11.22
*43†	18.21.32	18.17.36	18.13.40	18. 9.44	18. 5.48	18. 1.52
44†	18.29.29	18.25.33	18.21.37	18.17.41	18.13.45	18. 9.49

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.16	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.24	2.24
40	0.27	2.40
44	0.30	2,56
48	0.32	3.12
52	0.35	3.28
56	0.38	3.44
60	0.41	4. 0
64	0.43	4.16
68	0.46	4.32
72	0.49	4.48
76	0.51	5. 4
80	0.54	5.20
84	0.57	5.36
88	0.59	5.52
92	1. 2	6. 8
96	1. 5	6.24
100	1. 8	6.40
104	1.10	6.56
108	1.13	7.12
112	1.16	7.28
116	1.18	7.44
120	1.21	8 0
124	1.24	8.16
128	1.26	8.32
132	1.29	8.48
136	1.32	9. 4
140	1.35	9.20
144	1.37	9.36
148	1.40	9.52
152	1.43	10. 8
156	1.45	10.24
160	1.48	10.40
164	1.51	10.56
168	1.53	11.12
172	1.56	11.28
176	1.59	11.44
180	2. 2	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JUNE, 1844.

Day.	3	4	5	6	7	8	9	10
Eqn. of Time.	2m. 10s. add.	2m. 0s. add.	1m. 50s. add.	1m. 39s. add.	1m. 28s. add.	1m. 17s. add.	1m. 5s. add.	0m. 53s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	19. 9. 4	19. 5. 8	19. 1.12	18.57.16	18.53.20	18.49.24	18.45.28	18.41.32
2	19.13.55	19. 9.59	19. 6. 3	19. 2. 8	18.58.12	18.54.16	18.50.20	18.46.24
3	19.44.23	19.40.27	19.36.31	19.32.35	19.28.39	19.24.44	19.20.48	19.16.52
4	20. 9.33	20. 5.37	20. 1.41	19.57.45	19.53.49	19.49.54	19.45.58	19.42. 2
*5	20.40.22	20.36.26	20.32.31	20.28.35	20.24.39	20.20.43	20.16.47	20.12.51
6†	21. 6.48	21. 2.52	20.58.56	20.55. 0	20.51. 4	20.47. 8	20.43.12	20.39.16
7	21.19.50	21.15.54	21.11.58	21. 8. 2	21. 4. 6	21. 0.10	20.56.14	20.52.18
8	22. 2.23	21.58.27	21.54.31	21.50.35	21.46.39	21.42.43	21.38.48	21.34 52
9	22.21.25	22.17.29	22.13.33	22. 9.37	22. 5.41	22. 1.45	21.57.49	21.53.54
*10†	23.34.58	23.31. 3	23.27. 7	23.23.11	23.19.15	23.15.19	23.11.23	23. 7.27
*11	0.17. 0	0.13. 4	0. 9. 8	0. 5.12	0. 1. 16 23. 57. 20	23.53.25	23.49.29	23.45.33
*12	0.18.52	0.14.56	0.11. 0	0. 7. 4	0. 3. 8 23. 59. 12	23.55.16	23.51.20	23.47.25
13	0.28.14	0.24.18	0.20.22	0.16.26	0.12.30	0. 8.34	0. 4.38	0. 0. 42 23. 56. 47
*14	0.58.26	0.54.30	0.50.35	0.46.39	0.42.43	0.38.47	0.34.51	0.30.55
*15	1.32. 7	1.28.11	1.24.15	1.20.19	1.16.23	1.12.27	1. 8.31	1. 4.35
*16	1.49.51	1.45.55	1.41.59	1.38. 3	1.34. 7	1.30.11	1.26.15	1.22.19
17	2.36. 5	2.32. 9	2.28.13	2.24.17	2.20.21	2.16.26	2.12.30	2. 8.34
*18	2.42.34	2.38.38	2.34.42	2.30.46	2.26.50	2.22.54	2.18.58	2.15. 2
19†	2.47.11	2.43.15	2.39.19	2.35.23	2.31.27	2.27.31	2.23.35	2.19 39
*20	4.22.40	4.18.44	4.14.48	4.10.52	4. 6.56	4. 3. 0	3.59. 4	3.55. 8
21	4.31. 3	4.27. 7	4.23.11	4 19.15	4.15.19	4.11.24	4. 7.28	4. 3.32
*22†	5.11. 5	5. 7. 9	5. 3.13	4.59.17	4.55.21	4.51.25	4.47.29	4.43.34
*23	6. 4.55	6. 1. 0	5.57. 4	5.53. 8	5.49.12	5.45.16	5.41.20	5.37.24
24	6.51.51	6.47.55	6.43.59	6.40. 3	6.36. 7	6.32.11	6.28.15	6.24.19
*25	7.28.37	7.24.41	7.20.45	7.16.49	7.12.53	7. 8.57	7. 5. 2	7. 1. 6
*26†	8.27.28	8.23.32	8.19.36	8.15.40	8.11.44	8. 7.48	8. 3.52	7.59.57
27	8.51.48	8.47.52	8.43.56	8.40. 0	8.36. 4	8.32. 9	8.28.13	8.24.17
*28	9. 3.16	8.59.20	8.55 24	8.51.28	8.47.32	8.43.36	8.39.40	8.35.44
*29	9.18.53	9.14.57	9.11. 2	9. 7. 6	9. 3.10	8.59.14	8.55.18	8.51.22
*30	9.39.21	9.35.25	9.31.29	9.27.33	9.23.37	9.19.42	9.15.46	9.11.50
31	10.18.48	10.14.52	10.10.56	10. 7. 0	10. 3. 4	9.59. 8	9.55.12	9.51.16
32	10.38.12	10.34.17	10.30.21	10.26.25	10.22.29	10.18.33	10.14.37	10.10.41
33	10.46.41	10.42.45	10.38.49	10.34.54	10.30.58	10.27. 2	10.23. 6	10.19.10
*34†	11.29.50	11.25.54	11.21.58	11.18. 2	11.14. 6	11.10.11	11. 6.15	11. 2.19
35	12.17.23	12.13.27	12. 9.32	12. 5.36	12. 1.40	11.57.44	11.53.48	11.49.52
36	12.37.30	12.33.34	12.29.38	12.25.42	12.21.46	12.17 50	12.13.54	12. 9.58
37	13. 2.43	12.58.47	12.54.51	12.50.55	12.46.59	12.43. 3	12.39. 7	12.35.12
*38	13.41.17	13.37.21	13.33.25	13.29.29	13.25.33	13.21.37	13.17.41	13.13.45
*39†	14.52.36	14.48.40	14.44.44	14.40.48	14.36.52	14.32.56	14.29. 1	14.25. 5
40	15.22.37	15.18.41	15.14.45	15.10.49	15. 6.53	15. 2.57	14.59. 2	14.55. 6
*41	15.45.24	15.41.28	15.37.32	15.33.36	15.29.40	15.25.44	15.21.48	15.17.53
42	17. 7.26	17. 3.30	16.59.34	16.55.38	16.51.42	16.47.46	16.43.50	16.39.54
*43†	17.57.56	17.54. 0	17.50. 4	17.46. 8	17.42.13	17.38.17	17.34.21	17.30.25
44†	18. 5.54	18. 1.58	17.58. 2	17.54. 6	17.50.10	17.46.14	17.42.18	17.38.22

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JUNE, 1844.

Day.	11	12	13	14	15	16
Eqn. of Time.	0m. 41s. add.	0m. 29s. add.	0m. 17s. add.	0m. 4s. add.	0m. 9s. add. sub.	0m. 21s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	18.37.36	18.33.41	18.29.45	18.25.49	18.21.53	18.17.57
2	18.42.28	18.38.32	18.34.36	18.30.40	18.26.44	18.22.49
3	19.12.56	19. 9. 0	19. 5. 4	19. 1. 8	18.57.12	18.53.16
4	19.38. 6	19.34.10	19.30.14	19.26.18	19.22.22	19.18.26
*5	20. 8.55	20. 4.59	20. 1. 3	19.57. 7	19.53.12	19.49.16
6†	20.35.20	20.31.25	20.27.29	20.23.33	20.19.37	20.15.41
7	20.48.22	20.44.26	20.40.31	20.36.35	20.32.39	20.28.43
8	21.30.56	21.27. 0	21.23. 4	21.19. 8	21.15.12	21.11.16
9	21.49.58	21.46. 2	21.42. 6	21.38.10	21.34.14	21.30.18
*10†	23. 3.31	22.59.35	22.55.39	22.51.44	22.47.48	22.43.52
*11	23.41.37	23.37.41	23.33.45	23.29.49	23.25.53	23.21.57
*12	23.43.29	23.39.33	23.35.37	23.31.41	23.27.45	23.23.49
13	23.52.51	23.48.55	23.44.59	23.41. 3	23.37. 7	23.33.11
*14	0.26.59	0.23. 3	0.19. 7	0.15.11	0.11.16	0. 7.20
*15	1. 0.39	0.56.43	0.52.48	0.48.52	0.44.56	0.41. 0
*16	1.18.24	1.14.28	1.10.32	1. 6.36	1. 2.40	0.58.44
17	2. 4.38	2. 0.42	1.56.46	1.52.50	1.48.54	1.44.58
*18	2.11. 6	2. 7.10	2. 3.15	1.59.19	1.55.23	1.51.27
19†	2.15.43	2.11.48	2. 7.52	2. 3.56	2. 0. 0	1.56. 4
*20	3.51.13	3.47.17	3.43.21	3.39.25	3.35.29	3.31.33
21	3.59.36	3.55.40	3.51.44	3.47.48	3.43.52	3.39.56
*22†	4.39.38	4.35.42	4.31.46	4.27.50	4.23.54	4.19.58
*23	5.33.28	5.29.32	5.25.36	5.21.41	5.17.45	5.13.49
24	6.20.23	6.16.27	6.12.32	6. 8.36	6. 4.40	6. 0.44
*25	6.57.10	6.53.14	6.49.18	6.45.22	6.41.26	6.37.30
*26†	7.56. 1	7.52. 5	7.48. 9	7.44.13	7.40.17	7.36.21
27	8.20.21	8.16.25	8.12.29	8. 8.33	8. 4.37	8. 0.41
*28	8.31.48	8.27.52	8.23.57	8.20. 1	8.16. 5	8.12. 9
*29	8.47.26	8.43.30	8.39.34	8.35.38	8.31.43	8.27.47
*30	9 7.54	9. 3.58	9. 0. 2	8.56. 6	8.52.10	8.48.14
31	9.47.21	9.43.25	9.39.29	9.35.33	9.31.37	9.27.41
32	10. 6.45	10. 2.49	9.58.53	9.54.58	9.51. 2	9.47. 6
33	10.15.14	10.11.18	10. 7.22	10. 3.26	9.59.30	9.55.35
*34†	10.58.23	10.54.27	10.50.31	10.46.35	10.42.39	10.38.43
35	11.45.56	11.42. 0	11.38. 4	11.34. 8	11.30.13	11.26.17
36	12. 6. 2	12. 2. 6	11.58.11	11.54.15	11.50.19	11.46.23
37	12.31.16	12.27.20	12.23.24	12.19.28	12.15.32	12.11.36
*38	13. 9.49	13. 5.54	13. 1.58	12.58. 2	12.54. 6	12.50.10
*39†	14.21. 9	14.17.13	14.13.17	14 9.21	14. 5.25	14. 1.29
40	14.51.10	14.47.14	14.43.18	14.39.22	14.35.26	14.31.30
*41	15.13.57	15.10. 1	15. 6. 5	15. 2. 9	14.58.13	14.54.17
42	16.35.59	16.32. 3	16.28. 7	16.24.11	16.20.15	16.16.19
*43†	17.26.29	17.22.33	17.18.37	17.14.41	17.10.45	17. 6.49
44†	17.34.26	17.30.30	17.26.35	17.22.39	17.18.43	17.14.47

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.17	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.25	2.24
40	0.28	2.40
44	0.30	2,56
48	0.33	3.12
52	0.36	3.28
56	0.39	3.44
60	0.41	4. 0
64	0.44	4.16
68	0.47	4.32
72	0.50	4.48
76	0.52	5. 4
80	0.55	5.20
84	0.58	5.36
88	1. 1	5.52
92	1. 3	6. 8
96	1. 6	6.24
100	1. 9	6.40
104	1.12	6.56
108	1.14	7.12
112	1.17	7.28
116	1.20	7.44
120	1.23	8 0
124	1.25	8.16
128	1.28	8.32
132	1.31	8.48
136	1.34	9. 4
140	1.37	9.20
144	1.39	9.36
148	1.42	9.52
152	1.45	10. 8
156	1.48	10.24
160	1.50	10.40
164	1.53	10.56
168	1.56	11.12
172	1.59	11.28
176	2. 1	11.44
180	2. 4	12. 0

TABLE B.

Approximations, expressed in **MEAN TIME** of the **CULMINATIONS** of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JUNE, 1844.

Day.	17	18	19	20	21	22	23	24
Eqn. of Time.	0m. 34s. sub.	0m. 47s. sub.	1m. 0s. sub.	1m. 13s. sub.	1m. 26s. sub.	1m. 39s. sub.	1m. 52s. sub.	2m. 5s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	18.14. 1	18.10. 5	18. 6. 9	18. 2.13	17.58.17	17.54.22	17.50.26	17.46.30
2	18.18.53	18.14.57	18.11. 1	18. 7. 5	18. 3. 9	17.59.13	17.55.17	17.51.21
3	18.49.20	18.45.25	18.41.29	18.37.33	18.33.37	18.29.41	18.25.45	18.21.49
4	19.14.30	19.10.35	19. 6.39	19. 2.43	18.58.47	18.54.51	18.50.55	18.46.59
*5	19.45.20	19.41.24	19.37.28	19.33.32	19.29.36	19.25.40	19.21.44	19.17.48
6†	20.11.45	20. 7.49	20. 3.53	19.59.57	19.56. 1	19.52. 6	19.48.10	19.44.14
7	20.24.47	20.20.51	20.16.55	20.12.59	20. 9. 3	20. 5. 7	20. 1.12	19.57.16
8	21. 7.20	21. 3.24	20.59.29	20.55.33	20.51.37	20.47.41	20.43.45	20.39.49
9	21.26.22	21.22.26	21.18.30	21.14.35	21.10.39	21. 6.43	21. 2.47	20.58.51
*10†	22.39.56	22.36. 0	22.32. 4	22.28. 8	22.24.12	22.20.16	22.16.20	22.12.25
*11	23.18. 1	23.14. 6	23.10.10	23. 6.14	23. 2.18	22.58.22	22.54.26	22.50.30
*12	23.19.53	23.15.57	23.12. 1	23. 8. 6	23. 4.10	23. 0.14	22.56.18	22.52.22
13	23.29.15	23.25.19	23.21.23	23.17.28	23.13.32	23. 9.36	23. 5.40	23. 1.44
*14	0. 3. 24 23. 59. 28	23.55.32	23.51.36	23.47.40	23.43.44	23.39.48	23.35.52	23.31.57
*15	0.37. 4	0.33. 8	0.29.12	0.25.16	0.21.20	0.17.24	0.13.29	0. 9.33
*16	0.54.48	0.50.52	0.46.56	0.43. 0	0.39. 5	0.35. 9	0.31.13	0.27.17
17	1.41. 2	1.37 7	1.33.11	1.29.15	1.25.19	1.21.23	1.17.27	1.13.31
*18	1.47.31	1.43.35	1.39.39	1.35.43	1.31.47	1.27.51	1.23.56	1.20. 0
19†	1.52. 8	1.48.12	1.44.16	1.40.20	1.36.24	1.32.29	1.28.33	1.24.37
*20	3.27.37	3.23.41	3.19.45	3.15.49	3.11.54	3. 7.58	3. 4. 2	3. 0. 6
21	3.36. 0	3.32. 5	3.28. 9	3.24.13	3.20.17	3.16.21	3.12.25	3. 8.29
*22†	4.16. 2	4.12. 6	4. 8.10	4. 4.15	4. 0.19	3.56.23	3.52 27	3.48.31
*23	5. 9.53	5. 5.57	5. 2. 1	4.58. 5	4.54. 9	4.50.13	4.46.17	4.42.22
24	5.56.48	5.52.52	5.48.56	5.45. 0	5.41. 4	5.37. 8	5.33.13	5.29.17
*25	6.33.34	6.29.38	6.25.43	6.21.47	6.17.51	6.13.55	6. 9.59	6. 6. 3
*26†	7.32.25	7.28.29	7.24.33	7.20.38	7.16.42	7.12.46	7. 8.50	7. 4.54
27	7.56.45	7.52.50	7.48.54	7.44.58	7.41. 2	7.37. 6	7.33.10	7.29.14
*28	8. 8.13	8. 4.17	8. 0.21	7.56.25	7.52.29	7.48.33	7.44.38	7.40.42
*29	8.23.51	8.19.55	8.15.59	8.12. 3	8. 8. 7	8. 4.11	8. 0.15	7.56.19
*30	8.44.18	8.40.23	8.36.27	8.32.31	8.28.35	8.24.39	8.20.43	8.16.47
31	9.23.45	9.19.49	9.15.53	9.11.57	9. 8. 2	9. 4. 6	9. 0.10	8.56.14
32	9.43.10	9.39.14	9.35.18	9.31.22	9.27.26	9.23.30	9.19.34	9.15.39
33	9.51.39	9.47.43	9.43.47	9.39.51	9.35.55	9.31.59	9.28. 3	9.24. 7
*34†	10.34.47	10.30.52	10.26.56	10.23. 0	10.19. 4	10.15. 8	10.11.12	10. 7.16
35	11.22.21	11.18.25	11.14.29	11.10.33	11. 6.37	11. 2.41	10.58.45	10.54.49
36	11.42.27	11.38.31	11.34.35	11.30.39	11.26.43	11.22.47	11.18.52	11.14.56
37	12. 7.40	12. 3.44	11.59.48	11.55.53	11.51.57	11.48. 1	11.44. 5	11.40. 9
*38	12.46.14	12.42.18	12.38.22	12.34.26	12.30.30	12.26.35	12.22.39	12.18.43
*39†	13.57.33	13.53.37	13.49.42	13.45.46	13.41.50	13.37.54	13.33.58	13.30. 2
40	14.27.34	14.23.38	14.19.43	14.15.47	14.11.51	14. 7.55	14. 3.59	14. 0. 3
*41	14.50.21	14.46.25	14.42.29	14.38.34	14.34.38	14.30.42	14.26.46	14.22.50
42	16.12.23	16. 8.27	16. 4.31	16. 0.35	15.56.40	15.52.44	15.48.48	15.44.52
*43†	17. 2.54	16.58.58	16.55. 2	16.51. 6	16.47.10	16.43.14	16.39.18	16.35.22
44†	17.10.51	17. 6.55	17. 2.59	16.59. 3	16.55. 7	16.51.11	16.47.16	16.43.20

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JUNE, 1844.

Day.	25	26	27	28	29	30
Eqn. of Time.	2m. 18s. sub.	2m. 30s. sub.	2m. 43s. sub.	2m. 55s. sub.	3m. 7s. sub.	3m. 19s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	17.42.34	17.38.38	17.34.42	17.30.46	17.26.50	17.22.54
2	17.47.25	17.43.30	17.39.34	17.35.38	17.31.42	17.27.46
3	18.17.53	18.13.57	18.10. 1	18. 6. 6	18. 2.10	17.58.14
4	18.43. 3	18.39. 7	18.35.11	18.31.16	18.27.20	18.23.24
*5	19.13.53	19. 9.57	19. 6. 1	19. 2. 5	18.58. 9	18.54.13
6†	19.40.18	19.36.22	19.32.26	19.28.30	19.24.34	19.20.38
7	19.53.20	19.49.24	19.45.28	19.41.32	19.37.36	19.33.40
8	20.35.53	20.31.57	20.28. 1	20.24. 5	20.20.10	20.16.14
9	20.54.55	20.50.59	20.47. 3	20.43. 7	20.39.11	20.35.16
*10†	22. 8.29	22. 4.33	22. 0.37	21.56.41	21.52.45	21.48.49
*11	22.46.34	22.42.38	22.38.42	22.34.47	22.30.51	22.26.55
*12	22.48.26	22.44.30	22.40.34	22.36.38	22.32.42	22.28.47
13	22.57.48	22.53.52	22.49.56	22.46. 0	22.42. 4	22.38. 9
*14	23.28. 1	23.24. 5	23.20. 9	23.16.13	23.12.17	23. 8.21
*15	0. 5.37	0. 1. 41 23. 57. 45	23.53.49	23.49.53	23.45.57	23.42. 1
*16	0.23.21	0.19.25	0.15.29	0.11.33	0. 7.37	0. 3. 41 23. 59. 46
17	1. 9.35	1. 5.39	1. 1.43	0.57.48	0.53.52	0.49.56
*18	1.16. 4	1.12. 8	1. 8.12	1. 4.16	1. 0.20	0.56.24
19†	1.20.41	1.16.45	1.12.49	1. 8.53	1. 4.57	1. 1. 1
*20	2.56.10	2.52.14	2.48.18	2.44.22	2.40.26	2.36.30
21	3. 4.33	3. 0.37	2.56.41	2.52.46	2.48.50	2.44.54
*22†	3.44.35	3.40.39	3.36.43	3.32.47	3.28.51	3.24.56
*23	4.38.26	4.34.30	4.30.34	4.26.38	4.22.42	4.18.46
24	5.25.21	5.21.25	5.17.29	5.13.33	5. 9.37	5. 5.41
*25	6. 2. 7	5.58.11	5.54.15	5.50.19	5.46.24	5.42.28
*26†	7. 0.58	6.57. 2	6.53. 6	6.49.10	6.45.14	6.41.19
27	7.25.18	7.21.22	7.17.26	7.13.31	7. 9.35	7. 5.39
*28	7.36.46	7.32.50	7.28.54	7.24.58	7.21. 2	7.17. 6
*29	7.52.24	7.48.28	7.44.32	7.40.36	7.36.40	7.32.44
*30	8.12.51	8. 8.55	8. 4.59	8. 1. 4	7.57. 8	7.53.12
31	8.52.18	8.48.22	8.44.26	8.40.30	8.36.34	8.32.38
32	9.11.43	9. 7.47	9. 3.51	8.59.55	8.55.59	8.52. 3
33	9.20.11	9.16.16	9.12.20	9. 8.24	9. 4.28	9. 0.32
*34†	10. 3.20	9.59.24	9.55.28	9.51.33	9.47.37	9.43.41
35	10.50.54	10.46.58	10.43. 2	10.39. 6	10.35.10	10.31.14
36	11.11. 0	11. 7. 4	11. 3. 8	10.59.12	10.55.16	10.51.20
37	11.36.13	11.32.17	11.28.21	11.24.25	11.20.29	11.16.34
*38	12.14.47	12.10.51	12. 6.55	12. 2.59	11.59. 3	11.55. 7
*39†	13.26. 6	13.22.10	13.18.14	13.14.18	13.10.23	13. 6.27
40	13.56. 7	13.52.11	13.48.15	13.44.19	13.40.24	13.36.28
*41	14.18.54	14.14.58	14.11. 2	14. 7. 6	14. 3.10	13.59.15
42	15.40.56	15.37. 0	15.33. 4	15.29. 8	15.25.12	15.21.16
*43†	16.31.26	16.27.30	16.23.35	16.19.39	16.15.43	16.11.47
44†	16.39.24	16.35.28	16.31.32	16.27.36	16.23.40	16.19.44

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.17	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.25	2.24
40	0.28	2.40
44	0.31	2.56
48	0.33	3.12
52	0.36	3.28
56	0.39	3.44
60	0.42	4. 0
64	0.44	4.16
68	0.47	4.32
72	0.50	4.48
76	0.53	5. 4
80	0.55	5.20
84	0.58	5.36
88	1. 1	5.52
92	1. 4	6. 8
96	1. 7	6.24
100	1. 9	6.40
104	1.12	6.56
108	1.15	7.12
112	1.18	7.28
116	1.20	7.44
120	1.23	8. 0
124	1.26	8.16
128	1.29	8.32
132	1.31	8.48
136	1.34	9. 4
140	1.37	9.20
144	1.40	9.36
148	1.42	9.52
152	1.45	10. 8
156	1.48	10.24
160	1.51	10.40
164	1.54	10.56
168	1.56	11.12
172	1.59	11.28
176	2. 2	11.44
180	2. 5	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JULY, 1844.

Day.	1	2	3	4	5	6	7	8
Eqn. of Time.	3m. 30s. sub.	3m. 41s. sub.	3m. 52s. sub.	4m. 3s. sub.	4m. 14s. sub.	4m. 24s. sub.	4m. 33s. sub.	4m. 43s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	17.18.58	17.15. 3	17.11. 7	17. 7.11	17. 3.15	16.59.19	16.55.23	16.51.27
2	17.23.50	17.19.54	17.15.58	17.12. 2	17. 8. 6	17. 4.11	17. 0.15	16.56.19
3	17.54.18	17.50.22	17.46.26	17.42.30	17.38.34	17.34.38	17.30.42	17.26.47
4	18.19.28	18.15.32	18.11.36	18. 7.40	18. 3.44	17.59.48	17.55.52	17.51.57
*5	18.50.17	18.46.21	18.42.25	18.38.29	18.34.34	18.30.38	18.26.42	18.22.46
6†	19.16.42	19.12.47	19. 8.51	19. 4.55	19. 0.59	18.57. 3	18.53. 7	18.49.11
7	19.29.44	19.25.48	19.21.53	19.17.57	19.14. 1	19.10. 5	19. 6. 9	19. 2.13
8	20.12.18	20. 8.22	20. 4.26	20. 0.30	19.56.34	19.52.38	19.48.42	19.44.46
9	20.31.20	20.27.24	20.23.28	20.19.32	20.15.36	20.11.40	20. 7.44	20. 3.48
*10†	21.44.53	21.40.57	21.37. 1	21.33. 6	21.29.10	21.25.14	21.21.18	21.17.22
*11	22.22.59	22.19. 3	22.15. 7	22.11.11	22. 7.15	22. 3.19	21.59.23	21.55.28
*12	22.24.51	22.20.55	22.16.59	22.13. 3	22. 9. 7	22. 5.11	22. 1.15	21.57.19
13	22.34.13	22.30.17	22.26.21	22.22.25	22.18.29	22.14.33	22.10.37	22. 6.41
*14	23. 4.25	23. 0.29	22.56.33	22.52.38	22.48.42	22.44.46	22.40.50	22.36.54
*15	23.38. 4	23.34. 9	23.30.13	23.26.17	23.22.21	23.18.25	23.14.29	23.10.33
*16	23.55.50	23.51.54	23.47.58	23.44. 2	23.40. 6	23.36.10	23.32 14	23.28.18
17	0.46. 0	0.42. 4	0.38. 8	0.34.12	0.30.16	0.26.20	0.22.24	0.18.29
*18	0.52.28	0.48.32	0.44 37	0.40.41	0.36.45	0.32.49	0.28.53	0.24.57
19†	0.57. 5	0.53.10	0.49.14	0.45.18	0.41.22	0.37.26	0.33.30	0.29.34
*20	2.32.35	2.28.39	2.24.43	2.20.47	2.16.50	2.12.54	2. 8.58	2. 5. 2
21	2.40.58	2.37. 2	2.33. 6	2.29.10	2.25.14	2.21.18	2.17.22	2.13.27
*22†	3.21. 0	3.17. 4	3.13. 8	3. 9.12	3. 5.16	3. 1.20	2.57.24	2.53.28
*23	4.14.50	4.10.54	4. 6.58	4. 3. 3	3.59. 7	3.55.11	3.51.15	3.47.19
24	5. 1.45	4.57.49	4.53.54	4.49.58	4.46. 2	4.42. 6	4.38.10	4.34.14
*25	5.38.32	5.34.36	5.30.40	5.26.44	5.22.48	5.18.52	5.14.56	5.11. 0
*26†	6.37.23	6.33.27	6.29.31	6.25.35	6.21.39	6.17.43	6.13.47	6. 9.51
27	7. 1.43	6.57.47	6.53.51	6.49.55	6.45.59	6.42. 3	6.38. 7	6.34.12
*28	7.13.10	7. 9.14	7. 5.19	7. 1.23	6.57.27	6.53.31	6.49.35	6.45.39
*29	7.28.48	7.24.52	7.20.56	7.17. 0	7.13. 5	7. 9. 9	7. 5.13	7. 1.17
*30	7.49.16	7.45.20	7.41.24	7.37.28	7.33.32	7.29.36	7.25.40	7.21.45
31	8.28.43	8.24.47	8.20.51	8.16.55	8.12.59	8. 9. 3	8. 5. 7	8. 1.11
32	8.48. 7	8.44.11	8.40.15	8.36.20	8.32.24	8.28.28	8.24.32	8.20.36
33	8.56.36	8.52.40	8.48.44	8.44.48	8.40.52	8.36.57	8.33. 1	8.29. 5
*34†	9.39.45	9.35.49	9.31.53	9.27.57	9.24. 1	9.20. 5	9.16. 9	9.12.14
35	10.27.18	10.23.22	10.19.26	10.15.30	10.11.35	10. 7.39	10. 3.43	9.59.47
36	10.47.24	10.43.28	10.39.33	10.35.37	10.31.41	10.27.45	10.23.49	10.19.53
37	11.12.37	11. 8.41	11. 4.45	11. 0.49	10.56.53	10.52.57	10.49. 1	10.45. 5
*38	11.51.11	11.47.16	11.43.20	11.39.24	11.35.28	11.31.32	11.27.36	11.23.40
*39†	13. 2.31	12.58.35	12.54.39	12.50.43	12.46.47	12.42.51	12.38.55	12.34.59
40	13.32.32	13.28.36	13.24.40	13.20.44	13.16.48	13.12.52	13. 8.56	13. 5. 0
*41	13.55.19	13.51.23	13.47.27	13.43.31	13.39.35	13.35.39	13.31.43	13.27.47
42	15.17.21	15.13.25	15. 9.29	15. 5.33	15. 1.37	14.57.41	14.53.45	14.49.49
*43†	16. 7.51	16. 3 55	15.59.59	15.56. 3	15.52. 7	15.48.11	15.44.16	15.40.20
44†	16.15.48	16.11.52	16. 7.57	16. 4. 1	16. 0. 5	15.56. 9	15.52.13	15.48.17

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JULY, 1844.

Day.	9	10	11	12	13	14
Eqn. of Time.	4m. 52s. sub.	5m. 1s. sub.	5m. 9s. sub.	5m. 17s. sub.	5m. 24s. sub.	5m. 31s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	16.47.31	16.43.35	16.39.39	16.35.44	16.31.48	16.27.52
2	16.52.23	16.48.27	16.44.31	16.40.35	16.36.39	16.32.43
3	17.22.51	17.18.55	17.14.59	17.11. 3	17. 7. 7	17. 3.11
4	17.48. 1	17.44. 5	17.40. 9	17.36.13	17.32.17	17.28.21
*5	18.18.50	18.14.54	18.10.58	18. 7. 2	18. 3. 6	17.59.10
6†	18.45.15	18.41.19	18.37.23	18.33.28	18.29.32	18.25.36
7	18.58.17	18.54.21	18.50.25	18.46.29	18.42.34	18.38.38
8	19.40.51	19.36.55	19.32.59	19.29. 3	19.25. 7	19.21.11
9	19.59.52	19.55.57	19.52. 1	19.48. 5	19.44. 9	19.40.13
*10†	21.13.26	21. 9.30	21. 5.34	21. 1.38	20.57.42	20.53.47
*11	21.51.32	21.47.36	21.43.40	21.39.44	21.35.48	21.31.52
*12	21.53.23	21.49.28	21.45.32	21.41.36	21.37.40	21.33.44
13	22. 2.45	21.58.50	21.54.54	21.50.58	21.47. 2	21.43. 6
*14	22.32.58	22.29. 2	22.25. 6	22.21.10	22.17.14	22.13.19
*15	23. 6.37	23. 2.41	22.58.45	22.54.50	22.50.54	22.46.58
*16	23.24.22	23.20.27	23.16.31	23.12.35	23. 8.39	23. 4.43
17	0.14.33	0.10.37	0. 6.41	0. 2. 45 23. 58. 49	23.54.53	23.50.57
*18	0.21. 1	0.17. 5	0.13. 9	0. 9.13	0. 5.18	0. 1. 22 23. 57. 26
19†	0.25.38	0.21.42	0.17.46	0.13.51	0. 9.55	0. 5.59
*20	2. 1. 6	1.57.10	1.53.15	1.49.19	1.45.23	1.41.27
21	2. 9.31	2. 5.35	2. 1.39	1.57.43	1.53.47	1.49.51
*22†	2.49.32	2.45.37	2.41.41	2.37.45	2.33.49	2.29.53
*23	3.43.23	3.39.27	3.35.31	3.31.35	3.27.39	3.23.44
24	4.30.18	4.26.22	4.22.26	4.18.30	4.14.35	4.10.39
*25	5. 7. 5	5. 3. 9	4.59.13	4.55.17	4.51.21	4.47.25
*26†	6. 5.55	6. 2. 0	5.58. 4	5.54. 8	5.50.12	5.46.16
27	6.30.16	6.26.20	6.22.24	6.18.28	6.14.32	6.10.36
*28	6.41.43	6.37.47	6.33.51	6.29.55	6.26. 0	6.22. 4
*29	6.57.21	6.53.25	6.49.29	6.45.33	6.41.37	6.37.41
*30	7.17.49	7.13.53	7. 9.57	7. 6. 1	7. 2. 5	6.58. 9
31	7.57.15	7.53.19	7.49.24	7.45.28	7.41.32	7.37.36
32	8.16.40	8.12.44	8. 8.48	8. 4.52	8. 0.56	7.57. 1
33	8.25. 9	8.21.13	8.17.17	8.13.21	8. 9.25	8. 5.29
*34†	9. 8.18	9. 4.22	9. 0.26	8.56.30	8.52.34	8.48.38
35	9.55.51	9.51.55	9.47.59	9.44. 3	9.40. 7	9.36.11
36	10.15.57	10.12. 1	10. 8. 5	10. 4. 9	10. 0.14	9.56.18
37	10.41. 9	10.37.14	10.33.18	10.29.22	10.25.26	10.21.30
*38	11.19.44	11.15.48	11.11.52	11. 7.57	11. 4. 1	11. 0. 5
*39†	12.31. 4	12.27. 8	12.23.12	12.19.16	12.15.20	12.11.24
40	13. 1. 5	12.57. 9	12.53.13	12.49.17	12.45.21	12.41.25
*41	13.23.51	13.19.56	13.16. 0	13.12. 4	13. 8. 8	13. 4.12
42	14.45.53	14.41.57	14.38. 2	14.34. 6	14.30.10	14.26.14
*43†	15.36.24	15.32.28	15.28.32	15.24.36	15.20.40	15.16.44
44†	15.44.21	15.40.25	15.36.29	15.32.33	15.28.38	15.24.42

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.16	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.25	2.24
40	0.27	2.40
44	0.30	2.56
48	0.33	3.12
52	0.36	3.28
56	0.38	3.44
60	0.41	4. 0
64	0.44	4.16
68	0.46	4.32
72	0.49	4.48
76	0.52	5. 4
80	0.55	5.20
84	0.57	5.36
88	1. 0	5.52
92	1. 3	6. 8
96	1. 6	6.24
100	1. 8	6.40
104	1.11	6.56
108	1.14	7.12
112	1.17	7.28
116	1.19	7.44
120	1.22	8. 0
124	1.25	8.16
128	1.28	8.32
132	1.30	8.48
136	1.33	9. 4
140	1.36	9.20
144	1.38	9.36
148	1.41	9.52
152	1.44	10. 8
156	1.47	10.24
160	1.49	10.40
164	1.52	10.56
168	1.55	11.12
172	1.58	11.28
176	2. 0	11.44
180	2. 3	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JULY, 1844.

Day.	15	16	17	18	19	20	21	22
Eqn. of Time.	5m. 37s. sub.	5m. 43s. sub.	5m. 48s. sub.	5m. 53s. sub.	5m. 58s. sub.	6m. 1s. sub.	6m. 5s. sub.	6m. 7s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	16.23.56	16.20. 0	16.16. 4	16.12. 8	16. 8.12	16. 4.16	16. 0.20	15.56.25
2	16.28.47	16.24.52	16.20.56	16.17. 0	16.13. 4	16. 9. 8	16. 5.12	16, 1.16
3	16.59.15	16.55.19	16.51.23	16.47.28	16.43.32	16,39.36	16.35.40	16.31.44
4	17.24.25	17.20.29	17.16.33	17.12.38	17. 8.42	17. 4.46	17. 0.50	16.56.54
*5	17.55.15	17.51.19	17.47.23	17.43.27	17.39.31	17.35.35	17.31.39	17.27.43
6†	18.21.40	18.17.44	18.13.48	18. 9.52	18. 5.56	18. 2. 0	17.58. 4	17.54. 9
7	18.34.42	18.30.46	18.26.50	18.22.54	18.18.58	18.15. 2	18.11. 6	18. 7.10
8	19.17.15	19.13.19	19. 9.23	19. 5.27	19. 1.32	18.57.36	18.53.40	18.49.44
9	19.36.17	19.32.21	19.28.25	19.24.29	19.20.33	19.16.38	19.12.42	19. 8.46
*10†	20.49.51	20.45.55	20.41.59	20.38. 3	20.34. 7	20.30.11	20.26.15	20.22.19
*11	21.27.56	21.24. 0	21.20. 4	21.16. 9	21.12.13	21. 8.17	21. 4.21	21. 0.25
*12	21.29.48	21.25.52	21.21.56	21.18. 0	21.14. 4	21.10. 9	21. 6.13	21. 2.17
13	21.39.10	21.35.14	21.31.18	21.27.22	21.23.26	21.19.31	21.15.35	21.11.39
*14	22. 9.23	22. 5.27	22. 1.31	21.57.35	21.53.39	21.49.43	21.45.47	21.41.51
*15	22.43. 2	22.39. 6	22.35.10	22.31.14	22.27.19	22.23.23	22.19.27	22.15.31
*16	23. 0.47	22.56.51	22.52.55	22.48.59	22.45. 3	22.41. 8	22.37.12	22.33.16
17	23.47. 1	23.43. 5	23.39.10	23.35.14	23.31.18	23.27.22	23.23.26	23.19.30
*18	23.53.30	23.49.34	23.45.38	23.41.42	23.37.46	23.33.50	23.29.54	23.25.59
19†	0. 2. 3 23. 58. 7	23.54.11	23.50.15	23.46.19	23.42.23	23.38.27	23.34.32	23.30.36
*20	1.37.31	1.33.35	1.29.39	1.25.43	1.21.47	1.17.51	1.13.56	1.10. 0
21	1.45.55	1.41.59	1.38. 3	1.34. 8	1.30.12	1.26.16	1.22.20	1.18.24
*22†	2.25.57	2.22. 1	2.18. 5	2.14. 9	2.10.13	2. 6.18	2. 2.22	1.58.26
*23	3.19.48	3.15.52	3.11.56	3. 8. 0	3. 4. 4	3. 0. 8	2.56.12	2.52.16
24	4. 6.43	4. 2.47	3.58.51	3.54.55	3.50.59	3.47. 3	3.43. 7	3.39.11
*25	4.43.29	4.39.33	4.35.37	4.31.41	4.27.46	4.23.50	4.19.54	4.15.58
*26†	5.42.20	5.38.24	5.34.28	5.30.32	5.26.36	5.22.41	5.18.45	5.14.49
27	6. 6.40	6. 2.44	5.58.48	5.54.53	5.50.57	5.47. 1	5.43. 5	5.39. 9
*28	6.18. 8	6.14.12	6.10.16	6. 6.20	6. 2.24	5.58.28	5.54.32	5.50.36
*29	6.33.46	6.29.50	6.25.54	6.21.58	6.18. 2	6.14. 6	6.10.10	6. 6.14
*30	6.54.13	6.50.17	6.46.21	6.42.26	6.38.30	6.34.34	6.30.38	6.26.42
31	7.33.40	7.29.44	7.25.48	7.21.52	7.17.56	7.14. 0	7.10. 5	7. 6. 9
32	7.53. 5	7.49. 9	7.45.13	7.41.17	7.37.21	7.33.25	7.29.29	7.25.33
33	8. 1.33	7.57.38	7.53.42	7.49.46	7.45.50	7.41.54	7.37.58	7.34. 2
*34†	8.44.42	8.40.46	8.36.50	8.32.55	8.28.59	8.25. 3	8.21. 7	8.17.11
35	9.32.16	9.28.20	9.24.24	9.20.28	9.16.32	9.12.36	9. 8.40	9. 4.44
36	9.52.22	9.48.26	9.44.30	9.40.34	9.36.38	9.32.42	9.28.46	9.24.50
37	10.17.34	10.13.38	10. 9.42	10. 5.46	10. 1.50	9.57.55	9.53.59	9.50. 3
*38	10.56. 9	10.52.13	10.48.17	10.44.21	10.40.25	10.36.29	10.32.33	10.28.38
*39†	12. 7.28	12. 3.32	11.59.36	11.55.40	11.51.45	11.47.49	11.43.53	11.39.57
40	12.37.29	12.33.33	12.29.37	12.25.41	12.21.46	12.17.50	12.13.54	12. 9.58
*41	13. 0.16	12.56.20	12.52.24	12.48.28	12.44.32	12.40.37	12.36.41	12.32.45
42	14.22.18	14.18.22	14.14.26	14.10.30	14. 6.34	14. 2.38	13.58.43	13.54.47
*43†	15.12.48	15. 8.52	15. 4.57	15. 1. 1	14.57. 5	14.53. 9	14.49.13	14.45.17
44†	15.20.46	15.16.50	15.12.54	15. 8.58	15. 5. 2	15. 1. 6	14.57.10	14.53.14

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in **MEAN TIME** of the **CULMINATIONS** of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JULY, 1844.

Day.	23	24	25	26	27	28
Eqn. of Time.	6m. 9s. sub.	6m. 10s. sub.	6m. 11s. sub.	6m. 11s. sub.	6m. 11s. sub.	6m. 10s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	15.52.29	15.48.33	15.44.37	15.40.41	15.36.45	15.32.49
2	15.57.20	15.53.24	15.49.28	15.45.33	15.41.37	15.37.41
3	16.27.48	16.23.52	16.19.56	16.16. 0	16.12. 4	16. 8. 9
4	16.52.58	16.49. 2	16.45. 6	16.41.10	16.37.14	16.33.19
*5	17.23.47	17.19.51	17.15.56	17.12. 0	17. 8. 4	17. 4. 8
6†	17.50.13	17.46.17	17.42.21	17.38.25	17.34.29	17.30.33
7	18. 3.15	17.59.19	17.55.23	17.51.27	17.47.31	17.43.35
8	18.45.48	18.41.52	18.37.56	18.34. 0	18.30. 4	18.26. 8
9	19. 4.50	19. 0.54	18.56.58	18.53. 2	18.49. 6	18.45.10
*10†	20.18.23	20.14.28	20.10.32	20. 6.36	20. 2.40	19.58.44
*11	20.56.29	20.52.33	20.48.37	20.44.41	20.40.45	20.36.50
*12	20.58.21	20.54.25	20.50.29	20.46.33	20.42.37	20.38.41
13	21. 7.43	21. 3.47	20.59.51	20.55.55	20.51.59	20.48. 3
*14	21.37.55	21.34. 0	21.30. 4	21.26. 8	21.22.12	21.18.16
*15	22 11.35	22. 7.39	22. 3.43	21.59.47	21.55.51	21.51.55
*16	22.29.20	22.25.24	22.21.28	22.17.32	22.13.36	22. 9.40
17	23.15.34	23.11.38	23. 7.42	23. 3.46	22.59.51	22.55.55
*18	23.22. 3	23.18. 7	23.14.11	23.10.15	23. 6.19	23. 2.23
19†	23.26.40	23.22.44	23.18.48	23.14.52	23.10.56	23. 7. 0
*20	1. 6. 4	1. 2. 8	0.58.12	0.54.16	0.50.20	0.46.24
21	1.14.28	1.10.32	1. 6.36	1. 2.40	0.58.44	0.54.49
*22†	1.54.30	1.50.34	1.46.38	1.42.42	1.38.46	1.34.50
*23	2.48.20	2.44.25	2.40.29	2.36.33	2.32.37	2.28.41
24	3.35.16	3.31.20	3.27.24	3.23.28	3.19.32	3.15.36
*25	4.12. 2	4. 8. 6	4. 4.10	4. 0.14	3.56.18	3.52.22
*26†	5.10.53	5. 6.57	5. 3. 1	4.59. 5	4.55. 9	4.51.13
27	5.35.13	5.31.17	5.27.21	5.23.25	5.19.29	5.15.34
*28	5.46.41	5.42.45	5.38.49	5.34.53	5.30.57	5.27. 1
*29	6. 2.18	5.58.22	5.54.27	5.50.31	5.46.35	5.42.39
*30	6.22.46	6.18.50	6.14.54	6.10.58	6. 7. 2	6. 3. 7
31	7. 2.13	6.58.17	6.54.21	6.50.25	6.46.29	6.42.33
32	7.21.37	7.17.42	7.13.46	7. 9.50	7. 5.54	7. 1.58
33	7.30. 6	7.26.10	7.22.14	7.18.19	7.14.23	7.10.27
*34†	8.13.15	8. 9.19	8. 5.23	8. 1.27	7.57.31	7.53.36
35	9. 0.48	8.56.52	8.52.57	8.49. 1	8.45. 5	8.41. 9
36	9.20.55	9.16.59	9.13. 3	9. 9. 7	9. 5.11	9. 1.15
37	9.46. 7	9.42.11	9.38.15	9.34.19	9.30.23	9.26.27
*38	10.24.42	10.20.46	10.16.50	10.12.54	10. 8.58	10. 5. 2
*39†	11.36. 1	11.32. 5	11.28. 9	11.24.13	11.20.17	11.16.21
40	12. 6. 2	12. 2. 6	11.58.10	11.54.14	11.50.18	11.46.22
*41	12.28.49	12.24.53	12.20.57	12.17. 1	12.13. 5	12. 9. 9
42	13.50.51	13.46.55	13.42.59	13.39. 3	13.35. 7	13.31.11
*43†	14.41.21	14.37.25	14.33.29	14.29.33	14.25.38	14.21.42
44†	14.49.19	14.45.23	14.41.27	14.37.31	14.33.35	14.29.39

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.13	1.20
24	0.16	1.36
28	0.19	1.52
32	0.21	2. 8
36	0.24	2.24
40	0.27	2.40
44	0.29	2,56
48	0.32	3.12
52	0.35	3.28
56	0.37	3.44
60	0.40	4. 0
64	0.43	4.16
68	0.45	4.32
72	0.48	4.48
76	0.50	5. 4
80	0.53	5.20
84	0.56	5.36
88	0.58	5.52
92	1. 1	6. 8
96	1. 4	6.24
100	1. 6	6.40
104	1. 9	6.56
108	1.12	7.12
112	1.14	7.28
116	1.17	7.44
120	1.20	8 0
124	1.22	8.16
128	1.25	8.32
132	1.28	8.48
136	1.30	9. 4
140	1.33	9.20
144	1.36	9.36
148	1.38	9.52
152	1.41	10. 8
156	1.44	10.24
160	1.46	10.40
164	1.49	10.56
168	1.52	11.12
172	1.54	11.28
176	1.57	11.44
180	2. 0	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

JULY. 1844. AUGUST.

Day.	29	30	31	1	2	3	4	5
Eqn. of Time.	6m. 8s. sub.	6m. 6s. sub.	6m. 3s. sub.	6m. 0s. sub.	5m. 56s. sub.	5m. 51s. sub.	5m. 46s. sub.	5m. 40s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	15.28.53	15.24.57	15.21. 1	15.17. 6	15.13.10	15. 9.14	15. 5.18	15. 1.22
2	15.33.45	15.29.49	15.25.53	15.21.57	15.18. 1	15.14. 5	15.10. 9	15. 6.14
3	16. 4.13	16. 0.17	15.56.21	15.52.25	15.48.29	15.44.33	15.40.37	15.36.41
4	16.29.23	16.25.27	16.21.31	16.17.35	16.13.39	16. 9.43	16. 5.47	16. 1.51
*5	17. 0.12	16.56.16	16.52.20	16.48.24	16.44.28	16.40.32	16.36.37	16.32.41
6†	17.26.37	17.22.41	17.18.45	17.14.50	17.10.54	17. 6.58	17. 3. 2	16.59. 6
7	17.39.39	17.35.43	17.31.47	17.27.51	17.23.56	17.20. 0	17.16. 4	17.12. 8
8	18.22.13	18.18.17	18.14.21	18.10.25	18. 6.29	18. 2.33	17.58.37	17.54.41
9	18.41.14	18.37.19	18.33.23	18 29.27	18.25.31	18.21.35	18.17.39	18.13.43
*10†	19.54.48	19.50.52	19.46.56	19.43. 0	19.39. 4	19.35. 9	19.31.13	19.27.17
*11	20.32.54	20.28.58	20.25. 2	20.21. 6	20.17.10	20.13.14	20. 9.18	20. 5.22
*12	20.34.45	20.30.50	20.26.54	20.22.58	20.19. 2	20.15. 6	20.11.10	20. 7.14
13	20.44. 7	20.40.12	20.36.16	20.32.20	20.28.24	20.24.28	20.20.32	20.16.36
*14	21.14.20	21.10.24	21. 6.28	21. 2.32	20.58.36	20.54.41	20.50.45	20.46.49
*15	21.47.59	21.44. 3	21.40. 7	21.36.12	21.32.16	21.28.20	21.24.24	21.20.28
*16	22. 5.44	22. 1.49	21.57.53	21.53.57	21.50. 1	21.46. 5	21.42. 9	21.38.13
17	22.51.59	22.48. 3	22.44. 7	22.40.11	22.36.15	22.32.19	22.28.23	22.24.27
*18	22.58.27	22.54.31	22.50.35	22.46.40	22.42.44	22.38.48	22.34.52	22.30.56
19†	23. 3. 4	22.59. 8	22.55.13	22.51.17	22.47.21	22.43.25	22.39.29	22.35.33
*20	0.42.28	0.38.32	0.34.37	0.30.41	0.26.45	0.22.49	0.18.53	0.14.57
21	0.50.53	0.46.57	0.43. 1	0.39. 5	0.35. 9	0.31.13	0.27.17	0.23.21
*22†	1.30.54	1.26.59	1.23. 3	1.19. 7	1.15.11	1.11.15	1. 7.19	1. 3.23
*23	2.24.45	2.20.49	2.16.53	2.12.57	2. 9. 1	2. 5. 6	2. 1.10	1.57.14
24	3.11.40	3. 7.44	3. 3.48	2.59,52	2.55.57	2.52. 1	2.48. 5	2.44. 9
*25	3.48.27	3.44.31	3.40.35	3.36.39	3.32.43	3.28.47	3.24.51	3.20.55
*26†	4.47.17	4.43.22	4.39.26	4.35.30	4.31.34	4.27.38	4.23.42	4.19.46
27	5.11.38	5. 7.42	5. 3.46	4.59.50	4.55.54	4.51.58	4.48. 2	4.44. 6
*28	5.23. 5	5.19. 9	5.15.13	5.11.17	5. 7.22	5. 3.26	4.59.30	4.55.34
*29	5.38.43	5.34.47	5.30.51	5.26.55	5.22.59	5.19. 3	5.15. 8	5.11.12
*30	5.59.11	5.55.15	5.51.19	5.47.23	5.43.27	5.39.31	5.35.35	5.31.39
31	6.38.37	6.34.41	6.30.46	6.26.50	6.22.54	6.18.58	6.15. 2	6.11. 6
32	6.58. 2	6.54. 6	6.50.10	6.46.14	6.42.18	6.38.23	6.34.27	6.30.31
33	7. 6.31	7. 2.35	6.58.39	6.54.43	6.50.47	6.46.51	6.42.55	6.39. 0
*34†	7.49.40	7.45.44	7.41.48	7.37.52	7.33.56	7.30. 0	7.26. 4	7.22. 8
35	8.37.13	8.33.17	8.29.21	8.25.25	8.21.29	8.17.33	8.13.38	8. 9.42
36	8.57.19	8.53.23	8.49.27	8.45.31	8.41.36	8.37.40	8.33.44	8.29.48
37	9.22.31	9.18.36	9.14.40	9.10.44	9. 6.48	9. 2.52	8.58.56	8.55. 0
*38	10. 1. 6	9.57.10	9.53.14	9.49.19	9.45.23	9.41.27	9.37.31	9.33.35
*39†	11.12.26	11. 8.30	11. 4.34	11. 0.38	10.56.42	10.52.46	10.48.50	10.44.54
40	11.42.27	11.38.31	11.34.35	11.30.39	11.26.43	11.22.47	11.18.51	11.14.55
*41	12. 5.13	12. 1.18	11.57.22	11.53.26	11.49.30	11.45.34	11.41.38	11.37.42
42	13.27.15	13.23.19	13.19.24	13.15.28	13.11.32	13. 7.36	13. 3.40	12.59.44
*43†	14.17.46	14.13.50	14. 9.54	14. 5.58	14. 2. 2	13.58. 6	13.54.10	13.50.14
44†	14.25.43	14.21.47	14.17.51	14.13.55	14.10. 0	14. 6. 4	14. 2. 8	13.58.12

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

AUGUST, 1844.

Day.	6	7	8	9	10	11
Eqn. of Time.	5m. 34s. sub.	5m. 27s. sub.	5m. 19s. sub.	5m. 11s. sub.	5m. 3s. sub.	4m. 53s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	14.57.26	14.53.30	14.49.34	14.45.38	14.41.42	14.37.47
2	15. 2.18	14.58.22	14.54.26	14.50.30	14.46.34	14.42.38
3	15.32.45	15.28.50	15.24.54	15.20.58	15.17. 2	15.13. 6
4	15.57.55	15.54. 0	15.50. 4	15.46. 8	15.42.12	15.38.16
*5	16.28.45	16.24.49	16.20.53	16.16.57	16.13. 1	16. 9. 5
6†	16.55.10	16.51.14	16.47.18	16.43.22	16.39.26	16.35.31
7	17. 8.12	17. 4.16	17. 0.20	16.56.24	16.52.28	16.48.32
8	17.50.45	17.46.49	17.42.54	17.38.58	17.35. 2	17.31. 6
9	18. 9.47	18. 5.51	18. 1.55	17.58. 0	17.54. 4	17.50. 8
*10†	19.23.21	19.19.25	19.15.29	19.11.33	19. 7.37	19. 3.41
*11	20. 1.26	19.57.31	19.53.35	19.49.39	19.45.43	19.41.47
*12	20. 3.18	19.59.22	19.55.26	19.51.31	19.47.35	19.43.39
13	20,12.40	20. 8.44	20. 4.48	20. 0.53	19·56.57	19.53. 1
*14	20.42.53	20.38.57	20.35. 1	20.31. 5	20.27. 9	20.23.13
*15	21.16.32	21.12.36	21. 8.40	21. 4.44	21. 0.48	20.56.53
*16	21.34.17	21.30.21	21.26.25	21.22.30	21.18.34	21.14.38
17	22.20.32	22.16.36	22.12.40	22. 8.44	22. 4.48	22. 0.52
*18	22.27. 0	22.23. 4	22.19. 8	22.15.12	22.11.16	22. 7.21
19†	22,31.37	22.27.41	22.23.45	22.19.49	22.15.54	22.11.58
*20	0.11. 1	0. 7. 5	0. 3. 9 23. 59. 13	23.55.18	23.51.22	23.47.26
21	0.19.25	0.15.30	0.11.34	0. 7.38	0. 3. 42 23. 59. 46	23.55.50
*22†	0.59.27	0.55.31	0.51.35	0.47.40	0.43.44	0.39.48
*23	1.53.18	1.49.22	1.45.26	1.41.30	1.37.34	1.33.38
24	2.40.13	2.36.17	2.32.21	2.28.25	2.24.29	2.20.33
*25	3.16.59	3.13. 3	3. 9. 8	3. 5.12	3. 1.16	2.57.20
*26†	4.15.50	4.11.54	4. 7.58	4. 4. 3	4. 0. 7	3.56.11
27	4.40.10	4.36.15	4.32.19	4.28.23	4.24.27	4.20.31
*28	4.51.38	4.47.42	4.43.46	4.39.50	4.35.54	4.31.58
*29	5. 7.16	5. 3.20	4.59.24	4.55.28	4.51.32	4.47.36
*30	5.27.43	5.23.48	5.19.52	5.15.56	5.12. 0	5. 8. 4
31	6. 7.10	6. 3.14	5.59.18	5.55.22	5.51.27	5.47.31
32	6.26.35	6.22.39	6.18.43	6.14.47	6.10.51	6. 6.55
33	6.35. 4	6.31. 8	6.27.12	6.23.16	6.19.20	6.15.24
*34†	7.18.12	7.14.17	7.10.21	7. 6.25	7. 2.29	6.58.33
35	8. 5.46	8. 1.50	7.57.54	7.53.58	7.50. 2	7.46. 6
36	8.25.52	8.21.56	8.18. 0	8.14. 4	8.10. 8	8. 6.12
37	8.51. 4	8.47. 8	8.43.12	8.39.17	8.35.21	8.31.25
*38	9.29.39	9.25.43	9.21.47	9.17.51	9.13.55	9.10. 0
*39†	10.40.58	10.37. 2	10.33. 7	10.29.11	10.25.15	10.21.19
40	11.10.59	11. 7. 3	11. 3. 8	10.59.12	10.55.16	10.51.20
*41	11.33.46	11.29.50	11.25.54	11.21.59	11.18. 3	11.14. 7
42	12.55.48	12.51.52	12.47.56	12.44. 0	12.40. 5	12.36. 9
*43†	13.46.19	13.42.23	13.38.27	13.34.31	13.30.35	13.26.39
44†	13.54.16	13.50.20	13.46.24	13.42.28	13.38.32	13.34.36

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.13	1.20
24	0.15	1.36
28	0.18	1.52
32	0.20	2. 8
36	0.23	2.24
40	0.26	2.40
44	0.28	2.56
48	0.31	3.12
52	0.33	3.28
56	0.36	3.44
60	0.38	4. 0
64	0.41	4.16
68	0.43	4.32
72	0.46	4.48
76	0.49	5. 4
80	0.51	5.20
84	0.54	5.36
88	0.56	5.52
92	0.59	6. 8
96	1. 1	6.24
100	1. 4	6.40
104	1. 6	6.56
108	1. 9	7.12
112	1.12	7.28
116	1.14	7.44
120	1.17	8 0
124	1.19	8.16
128	1.22	8.32
132	1.24	8.48
136	1.27	9. 4
140	1.29	9.20
144	1.32	9.36
148	1.35	9.52
152	1.37	10. 8
156	1.40	10.24
160	1.42	10.40
164	1.45	10.56
168	1.47	11.12
172	1.50	11.28
176	1.52	11.44
180	1.55	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

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AUGUST, 1844.

Day.	12	13	14	15	16	17	18	19
Eqn. of Time.	4m. 44s. sub.	4m. 33s. sub.	4m. 22s. sub.	4m. 11s. sub.	3m. 59s. sub.	3m. 47s. sub.	3m. 34s. sub.	3m. 20s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	14.33.51	14.29.55	14.25.59	14.22. 3	14.18. 7	14.14.11	14.10.15	14. 6.19
2	14.38.42	14.34.46	14.30.50	14.26.55	14.22.59	14.19. 3	14.15. 7	14.11.11
3	15. 9.10	15. 5.14	15. 1.18	14.57.22	14.53.26	14.49.31	14.45.35	14.41.39
4	15.34.20	15.30.24	15.26.28	15.22.32	15.18.36	15.14.41	15.10.45	15. 6.49
*5	16. 5. 9	16. 1.13	15.57.18	15.53.22	15.49.26	15.45.30	15.41.34	15.37.38
6†	16.31.35	16.27.39	16.23.43	16.19.47	16.15.51	16.11.55	16. 7.59	16. 4. 3
7	16.44.37	16.40.41	16.36.45	16.32.49	16 28.53	16.24.57	16.21. 1	16.17. 5
8	17.27.10	17.23.14	17.19.18	17.15.22	17.11.26	17. 7.30	17. 3.35	16.59.39
9	17.46.12	17.42.16	17.38.20	17.34.24	17.30.28	17.26.32	17.22.36	17.18.41
*10†	18.59.45	18.55.50	18.51.54	18.47.58	18.44. 2	18.40. 6	18.36.10	18.32.14
*11	19.37.51	19.33.55	19.29.59	19.26. 3	19.22. 7	19.18.12	19.14.16	19.10.20
*12	19.39.43	19.35.47	19.31.51	19.27.55	19.23.59	19.20. 3	19.16. 7	19.12.12
13	19.49. 5	19.45. 9	19.41.13	19.37.17	19.33.21	19.29.25	19.25.29	19.21.34
*14	20.19.17	20.15.22	20.11.26	20. 7.30	20. 3.34	19.59.38	19.55.42	19.51.46
*15	20.52.57	20.49. 1	20.45. 5	20.41. 9	20.37.13	20.33.17	20.29.21	20.25.25
*16	21.10.42	21. 6.46	21. 2.50	20.58.54	20.54.58	20.51. 2	20.47. 6	20 43.11
17	21.56.56	21.53. 0	21.49. 4	21.45. 8	21.41.13	21.37.17	21.33.21	21.29.25
*18	22. 3.25	21.59.29	21.55.33	21.51.37	21.47.41	21.43.45	21 39.49	21.35.53
19†	22. 8. 2	22. 4. 6	22. 0.10	21.56.14	21.52.18	21.48.22	21.44.26	21.40.30
*20	23.43.30	23.39.34	23.35.38	23.31.42	23.27.46	23.23.50	23.19.54	23.15.59
21	23.51.54	23.47.58	23.44. 2	23.40. 6	23.36.11	23.32.15	23.28.19	23.24.23
*22†	0.35.52	0.31.56	0.28. 0	0.24. 4	0.20. 8	0.16.12	0.12.16	0. 8.21
*23	1.29.42	1.25.47	1.21.51	1.17.55	1.13.59	1.10. 3	1. 6. 7	1. 2.11
24	2.16.38	2.12.42	2. 8.46	2. 4.50	2. 0.54	1.56.58	1.53. 2	1.49. 6
*25	2.53.24	2.49.28	2.45.32	2.41.36	2.37.40	2.33.44	2.29.49	2.25.53
*26†	3.52.15	3.48.19	3.44.23	3.40.27	3.36.31	3.32.35	3.28.39	3.24.44
27	4.16.35	4.12.39	4. 8.43	4. 4.47	4. 0.51	3.56.56	3.53. 0	3.49. 4
*28	4.28. 3	4.24. 7	4.20.11	4.16.15	4.12.19	4. 8.23	4. 4.27	4. 0.31
*29	4.43.40	4.39.44	4.35.49	4.31.53	4.27.57	4.24. 1	4.20. 5	4.16. 9
*30	5. 4. 8	5. 0.12	4.56.16	4.52.20	4.48.24	4.44.29	4.40.33	4.36.37
31	5.43.35	5.39.39	5.35.43	5.31.47	5.27.51	5.23.55	5.19.59	5.16. 3
32	6. 2.59	5.59. 4	5.55. 8	5.51.12	5.47.16	5.43.20	5.39.24	5.35.28
33	6.11.28	6. 7.32	6. 3.36	5.59.41	5.55.45	5.51.49	5.47.53	5.43.57
*34†	6.54.37	6.50.41	6.46.45	6.42.49	6.38.53	6.34.58	6.31. 2	6.27. 6
35	7.42.10	7.38.14	7.34.19	7.30.23	7.26.27	7.22.31	7.18.35	7.14.39
36	8. 2.17	7.58.21	7.54.25	7.50.29	7.46.33	7.42.37	7.38.41	7.34.45
37	8.27.29	8.23.33	8.19.37	8.15.41	8.11.45	8. 7.49	8. 3.53	7.59.58
*38	9. 6. 4	9. 2. 8	8.58.12	8.54.16	8.50.20	8.46.24	8.42.28	8.38.32
*39†	10.17.23	10.13.27	10. 9.31	10. 5.35	10. 1.39	9.57.43	9.53.48	9.49.52
40	10.47.24	10.43.28	10.39.32	10.35.36	10.31.40	10.27.44	10.23.49	10.19.53
*41	11.10.11	11. 6.15	11. 2.19	10.58.23	10.54.27	10.50.31	10.46.35	10.42.40
42	12.32.13	12.28.17	12.24.21	12.20.25	12.16.29	12.12.33	12. 8.37	12. 4.41
*43†	13.22.43	13.18.47	13.14.51	13.10.55	13. 7. 0	13. 3. 4	12.59. 8	12.55.12
44†	13.30.41	13.26.45	13.22.49	13.18.53	13.14.57	13.11. 1	13. 7. 5	13. 3. 9

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

AUGUST, 1844.

Day.	20	21	22	23	24	25
Eqn. of Time.	3m. 6s. sub.	2m. 52s. sub.	2m. 37s. sub.	2m. 22s. sub.	2m. 6s. sub.	1m. 50s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	14. 2.23	13.58.28	13.54.32	13.50.36	13.46.40	13.42.44
2	14. 7.15	14. 3.19	13.59.23	13.55.27	13.51.31	13.47.36
3	14.37.43	14.33.47	14.29.51	14.25.55	14.21.59	14.18. 3
4	15. 2.53	14.58.57	14.55. 1	14.51. 5	14.47. 9	14.43.13
*5	15.33.42	15.29.46	15.25.50	15.21.54	15.17.59	15.14. 3
6†	16. 0. 7	15.56.12	15.52.16	15.48.20	15.44.24	15.40.28
7	16.13. 9	16. 9.13	16. 5.18	16. 1.22	15.57.26	15.53.30
8	16.55.43	16.51.47	16.47.51	16.43.55	16.39.59	16.36. 3
9	17.14.45	17.10.49	17. 6.53	17. 2.57	16.59. 1	16.55. 5
*10†	18.28.18	18.24.22	18.20.26	18.16.31	18.12.35	18. 8.39
*11	19. 6.24	19. 2.28	18.58.32	18.54.36	18.50.40	18.46.44
*12	19. 8.16	19. 4.20	19. 0.24	18.56.28	18.52.32	18.48.36
13	19.17.38	19.13.42	19. 9.46	19. 5.50	19. 1.54	18.57.58
*14	19.47.50	19.43.54	19.39.58	19.36. 3	19.32. 7	19.28.11
*15	20.21.29	20.17.34	20.13.38	20. 9.42	20. 5.46	20. 1.50
*16	20.39.15	20.35.19	20.31.23	20.27.27	20.23.31	20.19.35
17	21.25.29	21.21.33	21.17.37	21.13.41	21. 9.45	21. 5.49
*18	21.31.57	21.28. 2	21.24. 6	21.20.10	21.16.14	21.12.18
19†	21.36.35	21.32.39	21.28.43	21.24.47	21.20.51	21.16.55
*20	23.12. 3	23. 8. 7	23. 4.11	23. 0.15	22.56.19	22.52.23
21	23.20.27	23.16.31	23.12.35	23. 8.39	23. 4.43	23. 0.47
*22†	0. 4.25	0. 0. 29 23. 56. 33	23.52.37	23.48.41	23.44.45	23.40.49
*23	0.58.15	0.54.19	0.50.24	0.46.28	0.42.32	0.38.36
24	1.45.10	1.41.14	1.37.19	1.33.23	1.29.27	1.25.31
*25	2.21.57	2.18. 1	2.14. 5	2.10. 9	2. 6.13	2. 2.17
*26†	3.20.48	3.16.52	3.12.56	3. 9. 0	3. 5. 4	3. 1. 8
27	3.45. 8	3.41.12	3.37.16	3.33.20	3.29.24	3.25.28
*28	3.56.35	3.52.39	3.48.44	3.44.48	3.40.52	3.36.56
*29	4.12.13	4. 8.17	4. 4.21	4. 0.25	3.56.30	3.52.34
*30	4.32.41	4.28.45	4.24.49	4.20.53	4.16.57	4.13. 1
31	5.12. 8	5. 8.12	5. 4.16	5. 0.20	4.56.24	4.52.28
32	5.31.32	5.27.36	5.23.40	5.19.45	5.15.49	5.11.53
33	5.40. 1	5.36. 5	5.32. 9	5.28.13	5.24.17	5.20.22
*34†	6.23.10	6.19.14	6.15.18	6.11.22	6. 7.26	6. 3.30
35	7.10.43	7. 6.47	7. 2.51	6.58.55	6.55. 0	6.51. 4
36	7.30.49	7.26.53	7.22.58	7.19. 2	7.15. 6	7.11.10
37	7.56. 2	7.52. 6	7.48.10	7.44.14	7.40.18	7.36.22
*38	8.34.36	8.30.41	8.26.45	8.22.49	8.18.53	8.14.57
*39†	9.45.56	9.42. 0	9.38. 4	9.34. 8	9.30.12	9.26.16
40	10.15.57	10.12. 1	10. 8. 5	10. 4. 9	10. 0.13	9.56.17
*41	10.38.44	10.34.48	10.30.52	10.26.56	10.23. 0	10.19. 4
42	12. 0.46	11.56.50	11.52.54	11.48.58	11.45. 2	11.41. 6
*43†	12.51.16	12.47.20	12.43.24	12.39.28	12.35.32	12.31.36
44†	12.59.13	12.55.17	12.51.22	12.47.26	12.43.30	12.39.34

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.20	2. 8
36	0.22	2.24
40	0.25	2.40
44	0.27	2.56
48	0.30	3.12
52	0.32	3.28
56	0.35	3.44
60	0.37	4. 0
64	0.40	4.16
68	0.42	4.32
72	0.45	4.48
76	0.47	5. 4
80	0.50	5.20
84	0.52	5.36
88	0.55	5.52
92	0.57	6. 8
96	1. 0	6.24
100	1. 2	6.40
104	1. 4	6.56
108	1. 7	7.12
112	1. 9	7.28
116	1.12	7.44
120	1.14	8. 0
124	1.17	8.16
128	1.19	8.32
132	1.22	8.48
136	1.24	9. 4
140	1.27	9.20
144	1.29	9.36
148	1.32	9.52
152	1.34	10. 8
156	1.37	10.24
160	1.39	10.40
164	1.42	10.56
168	1.44	11.12
172	1.47	11.28
176	1.49	11.44
180	1.52	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

AUGUST. 1844. SEPTEMBER.

Day.	26	27	28	29	30	31	1	2
Eqn. of Time.	1m. 33s. sub.	1m. 16s. sub.	0m. 58s. sub.	0m. 41s. sub.	0m. 22s. sub.	0m. 4s. sub.	0m. 15s. add.	0m. 34s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	13.38.48	13.34.52	13.30.56	13.27. 0	13.23. 4	13.19. 9	13.15.13	13.11.17
2	13.43.40	13.39.44	10.35.48	13.31.52	13.27.56	13.24. 0	13.20. 4	13.16. 8
3	14.14. 7	14.10.12	14. 6.16	14. 2.20	13.58.24	13.54.28	13.50.32	13.46.36
4	14.39.17	14.35.22	14.31.26	14.27.30	14.23.34	14.19.38	14.15.42	14.11.46
*5	15.10. 7	15. 6.11	15. 2.15	14.58.19	14.54.23	14 50.27	14.46.31	14.42.35
6†	15.36.32	15.32.36	15.28.40	15.24.44	15.20.48	15.16.53	15.12.57	15. 9. 1
7	15.49.34	15.45.38	15.41.42	15.37.46	15.33.50	15.29.54	15.25.59	15.22. 3
8	16.32. 7	16.28.11	16.24.16	16.20.20	16.16.24	16.12.28	16. 8.32	16. 4.36
9	16.51. 9	16.47.13	16.43.17	16.39.22	16.35.26	16.31.30	16.27.34	16.23.38
*10†	18. 4.43	18. 0.47	17.56.51	17.52.55	17.48.59	17.45. 3	17.41. 7	17.37.12
*11	18.42.48	18.38.53	18.34.57	18.31. 1	18.27. 5	18.23. 9	18.19.13	18.15.17
*12	18.44.40	18.40.44	18.36.48	18.32.53	18.28.57	18 25. 1	18.21. 5	18.17. 9
13	18.54. 2	18.50. 6	18.46.10	18.42.15	18.38.19	18.34.23	18.30.27	18.26.31
*14	19.24.15	19.20.19	19.16.23	19.12.27	19. 8.31	19. 4.35	19. 0.39	18.56.44
*15	19.57.54	19.53.58	19.50. 2	19.46. 6	19.42.10	19.38.15	19.34.19	19.30.23
*16	20.15.39	20.11.43	20. 7.47	20. 3.52	19.59.56	19.56. 0	19.52. 4	19.48. 8
17	21. 1.54	20.57.58	20.54. 2	20.50. 6	20.46.10	20.42.14	20.38.18	20.34.22
*18	21. 8.22	21. 4.26	21. 0.30	20.56.34	20.52.38	20.48.43	20.44.47	20.40.51
19†	21.12.59	21. 9. 3	21. 5. 7	21. 1.11	20.57.16	20.53.20	20.49.24	20.45.28
*20	22.48.27	22.44.31	22.40.35	22.36.40	22.32.44	22.28.48	22.24.52	22.20.56
21	22.56.52	22.52.56	22.49. 0	22.45. 4	22.41. 8	22.37.12	22.33.16	22.29.20
*22†	23.36.53	23.32.57	23.29. 2	23.25. 6	23.21.10	23.17.14	23.13.18	23. 9.22
*23	0.34.40	0.30.44	0.26.48	0.22.52	0.18.56	0.15. 0	0.11. 4	0. 7. 9
24	1.21.35	1.17.39	1.13.43	1. 9.47	1. 5.51	1. 1.55	0.58. 0	0.54. 4
*25	1.58.21	1.54.25	1.50.30	1.46.34	1.42.38	1.38.42	1.34.46	1.30.50
*26†	2.57.12	2.53.16	2.49.20	2.45.25	2.41.29	2.37.33	2.33.37	2.29.41
27	3.21.32	3.17.37	3.13.41	3. 9.45	3. 5.49	3. 1.53	2.57.57	2.54. 1
*28	3.33. 0	3.29 4	3.25. 8	3.21.12	3.17.16	3.13.20	3. 9.25	3. 5.29
*29	3.48.38	3.44.42	3.40.46	3.36.50	3.32.54	3.28.58	3.25. 2	3.21. 6
*30	4. 9. 5	4. 5.10	4. 1.14	3.57.18	3.53.22	3.49.26	3.45.30	3.41.34
31	4.48.32	4.44.36	4.40.40	4.36.44	4.32.49	4.28.53	4.24.57	4.21. 1
32	5. 7.57	5. 4. 1	5. 0. 5	4.56. 9	4.52.13	4.48.17	4.44.21	4.40.26
33	5.16.26	5.12.30	5. 8.34	5. 4.38	5. 0.42	4.56.46	4.52.50	4.48.54
*34†	5.59.34	5.55.39	5.51.43	5.47.47	5.43.51	5.39.55	5.35.59	5.32. 3
35	6.47. 8	6.43.12	6.39.16	6.35.20	6.31.24	6.27.28	6.23.32	6.19.36
36	7. 7.14	7. 3.18	6.59.22	6.55.26	6.51.30	6.47.34	6.43.39	6.39.43
37	7.32.26	7.28.30	7.24.34	7.20.39	7.16.43	7.12.47	7. 8.51	7. 4.55
*38	8.11. 1	8. 7. 5	8. 3. 9	7.59.13	7.55.17	7.51.22	7.47.26	7.43.30
*39†	9.22.20	9.18.24	9.14.29	9.10.33	9. 6.37	9. 2 41	8.58.45	8.54.49
40	9.52.21	9.48.25	9.44.30	9.40.34	9.36.38	9.32.42	9.28.46	9.24.50
*41	10.15. 8	10.11.12	10. 7.16	10. 3.21	9.59.25	9.55.29	9.51.33	9.47.37
42	11.37.10	11.33.14	11.29.18	11.25.22	11.21.27	11.17.31	11.13.35	11. 9.39
*43†	12.27.41	12.23.45	12.19.49	12.15.53	12.11.57	12. 8. 1	12. 4. 5	12. 0. 9
44†	12.35.38	12.31.42	12.27.46	12.23.50	12.19.54	12.15.58	12.12. 3	12. 8. 7

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

SEPTEMBER, 1844.

Day.	3	4	5	6	7	8
Eqn. of Time.	0m. 53s. add.	1m. 13s. add.	1m. 32s. add.	1m. 52s. add.	2m. 12s. add.	2m. 32s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	13. 7.21	13. 3.25	12.59.29	12.55.33	12.51.37	12.47.41
2	13.12.12	13. 8.17	13. 4.21	13. 0.25	12.56.29	12.52.33
3	13.42.40	13.38.44	13.34.48	13.30.53	13.26.57	13.23. 1
4	14. 7.50	14. 3.54	13.59.58	13.56. 3	13.52. 7	13.48.11
*5	14.38.40	14.34.44	14.30.48	14.26.52	14.22.56	14.19. 0
6†	15. 5. 5	15. 1. 9	14.57.13	14.53.17	14.49.21	14.45.25
7	15.18. 7	15.14.11	15.10.15	15. 6.19	15. 2.23	14.58.27
8	16. 0.40	15.56.44	15.52.48	15.48.52	15.44.57	15.41. 1
9	16.19.42	16.15.46	16.11.50	16. 7.54	16. 3.58	16. 0. 3
*10†	17.33.16	17.29.20	17.25.24	17.21.28	17.17.32	17.13.36
*11	18.11.21	18. 7.25	18. 3.29	17.59.34	17.55.38	17.51.42
*12	18.13.13	18. 9.17	18. 5.21	18. 1.25	17.57.29	17.53.34
13	18.22.35	18.18.39	18.14.43	18.10.47	18. 6.51	18. 2.56
*14	18.52.48	18.48.52	18.44.56	18.41. 0	18.37. 4	18.33. 8
*15	19.26.27	19.22.31	19.18.35	19.14.39	19.10.43	19. 6.47
*16	19.44.12	19.40.16	19.36.20	19.32.24	19.28.28	19.24.33
17	20.30.26	20.26.30	20.22.35	20.18.39	20.14.43	20.10.47
*18	20.36.55	20.32.59	20.29. 3	20.25. 7	20.21.11	20.17.15
19†	20.41.32	20.37.36	20.33.40	20.29.44	20.25.48	20.21.52
*20	22.17. 0	22.13. 4	22. 9. 8	22. 5.12	22. 1.16	21.57.21
21	22.25.24	22.21.28	22.17.33	22.13.37	22. 9.41	22. 5.45
*22†	23. 5.26	23. 1.30	22.57.34	22.53.38	22.49.43	22.45.47
*23	0. 3. 13 23. 59. 17	23.55.21	23.51.25	23.47.29	23.43.33	23.39.37
24	0.50. 8	0.46.12	0.42.16	0.38.20	0.34.24	0.30.28
*25	1.26.54	1.22.58	1.19. 2	1.15. 6	1.11.11	1. 7.15
*26†	2.25.45	2.21.49	2.17.53	2.13.57	2.10. 1	2. 6. 6
27	2.50. 5	2.46. 9	2.42.13	2.38.18	2.34.22	2.30.26
*28	3. 1.33	2.57.37	2.53.41	2.49.45	2.45.49	2.41.53
*29	3.17.11	3.13.15	3. 9.19	3. 5.23	3. 1.27	2.57.31
*30	3.37.38	3.33.42	3.29.46	3.25.51	3.21.55	3.17.59
31	4.17. 5	4.13. 9	4. 9.13	4. 5.17	4. 1.21	3.57.25
32	4.36.30	4.32.34	4.28.38	4.24.42	4.20.46	4.16.50
33	4.44.58	4.41. 3	4.37. 7	4.33.11	4.29.15	4.25.19
*34†	5.28. 7	5.24.11	5.20.15	5.16.20	5.12.24	5. 8.28
35	6.15.41	6.11.45	6. 7.49	6. 3.53	5.59.57	5.56. 1
36	6.35.47	6.31.51	6.27.55	6.23.59	6.20. 3	6.16. 7
37	7. 0.59	6.57. 3	6.53. 7	6.49.11	6.45.15	6.41.20
*38	7.39.34	7.35.38	7.31.42	7.27.46	7.23.50	7.19.54
*39†	8.50.53	8.46.57	8.43. 1	8.39. 5	8.35.10	8.31.14
40	9.20.54	9.16.58	9.13. 2	9. 9. 6	9. 5.11	9. 1.15
*41	9.43.41	9.39.45	9.35.49	9.31.53	9.27.57	9.24. 2
42	11. 5.43	11. 1.47	10.57.51	10.53.55	10.49.59	10.46. 3
*43†	11.56.13	11.52.17	11.48.22	11.44.26	11.40.30	11.36.34
44†	12. 4.11	12. 0.15	11.56.19	11.52.23	11.48.27	11.44.31

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 2	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.19	2. 8
36	0.22	2.24
40	0.24	2.40
44	0.27	2.56
48	0.29	3.12
52	0.31	3.28
56	0.34	3.44
60	0.36	4. 0
64	0.39	4.16
68	0.41	4.32
72	0.43	4.48
76	0.46	5. 4
80	0.48	5.20
84	0.51	5.36
88	0.53	5.52
92	0.56	6. 8
96	0.58	6.24
100	1. 0	6.40
104	1. 3	6.56
108	1. 5	7.12
112	1. 8	7.28
116	1.10	7.44
120	1.12	8 0
124	1.15	8.16
128	1.17	8.32
132	1.20	8.48
136	1.22	9. 4
140	1.24	9.20
144	1.27	9.36
148	1.29	9.52
152	1.32	10. 8
156	1.34	10.24
160	1.37	10.40
164	1.39	10.56
168	1.41	11.12
172	1.44	11.28
176	1.46	11.44
180	1.49	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

SEPTEMBER, 1844.

Day.	9	10	11	12	13	14	15	16
Eqn. of Time.	2m. 53s. add.	3m. 14s. add.	3m. 34s. add.	3m. 55s. add.	4m. 16s. add.	4m. 37s. add.	4m. 58s. add.	5m. 19s add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	12.43.45	12.39.50	12.35.54	12.31.58	12.28. 2	12.24. 6	12.20.10	12.16.14
2	12.48.37	12.44.41	12.40.45	12.36.49	12.32.53	12.28.58	12.25. 2	12.21. 6
3	13.19. 5	13.15. 9	13.11.13	13. 7.17	13. 3.21	12.59.25	12.55.29	12.51.34
4	13.44.15	13.40.19	13.36.23	13.32.27	13.28.31	13.24.35	13.20.39	13.16.44
*5	14.15. 4	14.11. 8	14. 7.12	14. 3.16	13.59.21	13.55.25	13.51.29	13.47.33
6†	14.41.29	14.37.34	14.33.38	14.29.42	14.25.46	14.21.50	14.17.54	14.13.58
7	14.54.31	14.50.35	14.46.40	14.42.44	14.38.48	14.34.52	14.30.56	14.27. 0
8	15.37. 5	15.33. 9	15.29.13	15.25.17	15.21.21	15.17.25	15.13.29	15. 9.33
9	15.56. 7	15.52.11	15.48.15	15.44.19	15.40.23	15.36.27	15.32.31	15.28.35
*10†	17. 9.40	17. 5.44	17. 1.48	16.57.53	16.53.57	16.50. 1	16.46. 5	16.42. 9
*11	17.47.46	17.43.50	17.39.54	17.35.58	17.32. 2	17.28. 6	17.24.10	17.20.15
*12	17.49.38	17.45.42	17.41.46	17.37.50	17.33.54	17.29.58	17.26. 2	17.22. 6
13	17.59. 0	17.55. 4	17.51. 8	17.47.12	17.43.16	17.39.20	17.35.24	17.31.28
*14	18.29.12	18.25.16	18.21.20	18.17.25	18.13.29	18. 9.33	18. 5.37	18. 1.41
*15	19. 2.51	18.58.56	18.55. 0	18.51. 4	18.47. 8	18.43.12	18.39.16	18.35.20
*16	19.20.37	19.16.41	19.12.45	19. 8.49	19. 4.53	19. 0.57	18.57. 1	18.53. 5
17	20. 6.51	20. 2.55	19.58.59	19.55. 3	19.51. 7	19.47.11	19.43.16	19.39.20
*18	20.13.19	20. 9.24	20. 5.28	20. 1.32	19.57.36	19.53.40	19.49.44	19.45.48
19†	20.17.57	20.14. 1	20.10. 5	20. 6. 9	20. 2.13	19.58.17	19.54.21	19.50.25
*20	21.53.25	21.49.29	21.45.33	21.41.37	21.37.41	21.33.45	21.29.49	21.25.53
21	22. 1.49	21.57.53	21.53.57	21.50. 1	21.46. 5	21.42. 9	21.38.14	21.34.18
*22†	22.41.51	22.37.55	22.33.59	22.30. 3	22.26. 7	22.22.11	.2218.15	22.14.19
*23	23.35.41	23.31.45	23.27.50	23.23.54	23.19.58	23.16. 2	23.12. 6	23. 8 10
24	0.26.32	0.22.36	0.18.41	0.14.45	0.10.49	0. 6.53	0. 2. 57 23. 59. 1	23.55. 5
*25	1. 3.19	0.59.23	0.55.27	0.51.31	0.47.35	0.43.39	0.39.43	0.35.47
*26†	2. 2.10	1.58.14	1.54.18	1.50.22	1.46.26	1.42.30	1.38.34	1.34.38
27	2.26.30	2.22.34	2.18.38	2.14.42	2.10.46	2. 6.50	2. 2.54	1.58.59
*28	2.37.57	2.34. 1	2.30. 6	2.26.10	2.22.14	2.18.18	2.14.22	2.10.26
*29	2.53.35	2.49.39	2.45.43	2.41.47	2.37.52	2.33.56	2.30. 0	2.26. 4
*30	3.14. 3	3.10. 7	3. 6.11	3. 2.15	2.58.19	2.54.23	2.50.27	2.46.32
31	3.53.30	3.49.34	3.45.38	3.41.42	3.37.46	3.33.50	3.29.54	3.25.58
32	4.12.54	4. 8.58	4. 5. 2	4. 1. 7	3.57.11	3.53.15	3.49.19	3.45.23
33	4.21.23	4.17.27	4.13.31	4. 9.35	4. 5.39	4. 1.44	3.57.48	3.53.52
*34†	5. 4.32	5. 0.36	4.56.40	4.52.44	4.48.48	4.44.52	4.40.56	4.37. 1
35	5.52. 5	5.48. 9	5.44.13	5.40.17	5.36.22	5.32.26	5.28.30	5.24.34
36	6.12.11	6. 8.15	6. 4.20	6. 0.24	5.56.28	5.52.32	5.48.36	5.44.40
37	6.37.24	6.33.28	6.29.32	6.25.36	6.21.40	6.17.44	6.13.48	6. 9.52
*38	7.15.58	7.12. 3	7. 8. 7	7. 4.11	7. 0.15	6.56.19	6.52.23	6.48.27
*39†	8.27.18	8.23.22	8.19.26	8.15.30	8.11.34	8. 7.38	8. 3.42	7.59.46
40	8.57.19	8.53.23	8.49.27	8.45.31	8.41.35	8.37.39	8.33.43	8.29.47
*41	9.20. 6	9.16.10	9.12.14	9. 8.18	9. 4.22	9. 0.26	8.56.30	8.52.34
42	10.42. 8	10.38.12	10.34.16	10.30.20	10.26.24	10.22.28	10.18.32	10.14.36
*43†	11.32.38	11.28.42	11.24.46	11.20.50	11.16.54	11.12.58	11. 9. 3	11. 5. 7
44†	11.40.35	11.36.39	11.32.44	11.28.48	11.24.52	11.20.56	11.17. 0	11.13. 4

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

SEPTEMBER, 1844.

Day.	17	18	19	20	21	22
Eqn. of Time.	5m. 40s. add.	6m. 1s. add.	6m. 22s. add.	6m. 43s. add.	7m. 4s. add.	7m. 25s add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	12.12.18	12. 8.22	12. 4.26	12. 0.31	11.56.35	11.52.39
2	12.17.10	12.13.14	12. 9.18	12. 5.22	12. 1.26	11.57.30
3	12.47.38	12.43.42	12.39.46	12.35.50	12.31.54	12.27.58
4	13.12.48	13. 8.52	13. 4.56	13. 1. 0	12.57. 4	12.53. 8
*5	13.43.37	13.39.41	13.35.45	13.31.49	13.27.53	13.23.57
6†	14.10. 2	14. 6. 6	14. 2.10	13.58.15	13.54.19	13.50.23
7	14.23. 4	14.19. 8	14.15.12	14.11.16	14.17.21	14. 3.25
8	15. 5.38	15. 1.42	14.57.46	14.53.50	14.49.54	14.45.58
9	15.24.39	15.20.44	15.16.48	15.12.52	15. 8.56	15. 5. 0
*10†	16.38.13	16.34.17	16.30.21	16.26.25	16.22.29	16.18.34
*11	17.16.19	17.12.23	17. 8.27	17. 4.31	17. 0.35	16.56.39
*12	17.18.10	17.14.15	17.10.19	17. 6.23	17. 2.27	16.58.31
13	17.27.32	17.23.37	17.19.41	17.15.45	17.11.49	17. 7.53
*14	17.57.45	17.53.49	17.49.53	17.45.57	17.42. 1	17.38. 6
*15	18.31.24	18.27.28	18.23.32	18.19.37	18.15.41	18.11.45
*16	18.49. 9	18.45.14	18.41.18	18.37.22	18.33.26	18.29.30
17	19.35.24	19.31.28	19.27.32	19.23.36	19.19.40	19.15.44
*18	19.41.52	19.37.56	19.34. 0	19.30. 5	19.26. 9	19.22.13
19†	19.46.29	19.42.33	19.38.38	19.34.42	19.30.46	19.26.50
*20	21.21.57	21.18. 2	21.14. 6	21.10.10	21. 6.14	21. 2.18
21	21.30.22	21.26.26	21.22.30	21.18.34	21.14.38	21.10.42
*22†	22.10.24	22. 6.28	22. 2.32	21.58.36	21.54.40	21.50.44
*23	23. 4.14	23. 0.18	22.56.22	22.52.26	22.48.31	22.44.35
24	23.51. 9	23.47.13	23.43.17	23.39.22	23.35.26	23.31.30
*25	0.31.52	0.27.56	0.24. 0	0.20. 4	0.16. 8	0.12.12
*26†	1.30.42	1.26.47	1.22.51	1.18.55	1.14.59	1.11. 3
27	1.55. 3	1.51. 7	1.47.11	1.43.15	1.39.19	1.35.23
*28	2. 6.30	2. 2.34	1.58.38	1,54.42	1.50.47	1.46.51
*29	2.22. 8	2.18.12	2.14.16	2.10.20	2. 6.24	2. 2.28
*30	2.42.36	2.38.40	2.34.44	2.30.48	2.26.52	2.22.56
31	3.22. 2	3.18. 6	3.14.11	3.10.15	3. 6.19	3. 2.23
32	3.41.27	3.37.31	3.33.35	3.29.39	3,25.43	3.21.48
33	3.49.56	3.46. 0	3.42. 4	3.38. 8	3.34.12	3.30.16
*34†	4.33. 5	4.29. 9	4.25.13	4.21.17	4.17.21	4.13.25
35	5.20.38	5.16.42	5.12.46	5. 8.50	5. 4.54	5. 0.58
36	5.40.44	5.36.48	5.32.52	5.28.56	5.25, 1	5.21. 5
37	6. 5.56	6. 2. 1	5.58. 5	5.54. 9	5.50,13	5.46.17
*38	6.44.31	6.40.35	6.36.39	6.32.44	6.28.48	6.24.52
*39†	7.55.51	7.51.55	7.47.59	7.44. 3	7.40. 7	7.36.11
40	8.25.52	8.21.56	8.18. 0	8.14. 4	8.10. 8	8. 6.12
*41	8.48.38	8.44.43	8.40.47	8.36.51	8.32.55	8.28.59
42	10.10.40	10. 6.44	10. 2.49	9.58.53	9.54.57	9.51. 1
*43†	11. 1.11	10.57.15	10.53.19	10.49.23	10.45.27	10.41.31
44†	11. 9. 8	11. 5.12	11. 1.16	10.57.20	10.53.25	10.49.29

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 2	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.14	1.36
28	0 .17	1.52
32	0.19	2. 8
36	0.22	2.24
40	0.24	2.40
44	0.26	2.56
48	0.29	3.12
52	0.31	3.28
56	0.34	3.44
60	0.36	4. 0
64	0.38	4.16
68	0.41	4.32
72	0.43	4.48
76	0.45	5. 4
80	0.48	5.20
84	0.50	5.36
88	0.53	5.52
92	0.55	6. 8
96	0.57	6.24
100	1. 0	6.40
104	1. 2	6.56
108	1. 5	7.12
112	1. 7	7.28
116	1. 9	7.44
120	1.12	8. 0
124	1.14	8.16
128	1.17	8.32
132	1.19	8.48
136	1.21	9. 4
140	1.24	9.20
144	1.26	9.36
148	1.28	9.52
152	1.31	10. 8
156	1.33	10.24
160	1.36	10.40
164	1.38	10.56
168	1.40	11.12
172	1.43	11.28
176	1.45	11.44
180	1.48	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

SEPTEMBER, 1844.

Day.	23	24	25	26	27	28	29	30
Eqn. of Time.	7m. 46s. add.	8m. 7s. add.	8m. 27s. add.	8m. 48s. add.	9m. 8s. add.	9m. 28s. add.	9m. 47s. add.	10m. 7s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	11.48.43	11.44.47	11.40.51	11.36.55	11.32.59	11.29. 3	11.25. 7	11.21.12
2	11.53.34	11.49.39	11.45.43	11.41.47	11.37.51	11.33.55	11.29.59	11.26. 3
3	12.24. 2	12.20. 6	12.16.10	12.12.15	12. 8.19	12. 4.23	12. 0.27	11.56.31
4	12.49.12	12.45.16	12.41.20	12.37.25	12.33.29	12.29.33	12.25.37	12.21.41
*5	13.20. 2	13.16. 6	13.12.10	13. 8.14	13. 4.18	13. 0.22	12.56.26	12.52.30
6†	13.46.27	13.42.31	13.38.35	13.34.39	13.30.43	13.26.47	13.22.51	13.18.56
7	13.59.29	13.55.33	13.51.37	13.47.41	13.43.45	13.39.49	13.35.53	13.31.57
8	14.42. 2	14.38. 6	14.34.10	14.30.14	14.26.19	14.22.23	14.18.27	14.14.31
9	15. 1. 4	14.57. 8	14.53.12	14.49.16	14.45.20	14.41.25	14.37.29	14.33.33
*10†	16.14.38	16.10.42	16. 6.46	16. 2.50	15.58.54	15.54.58	15.51. 2	15.47. 6
*11	16.52.43	16.48.47	16.44.51	16.40.56	16.37. 0	16.33. 4	16.29. 8	16.25.12
*12	16.54.35	16.50.39	16.46.43	16.42.47	16.38.51	16.34.56	16.31. 0	16.27. 4
13	17. 3.57	17. 0. 1	16.56. 5	16.52. 9	16.48.13	16.44.18	16.40.22	16.36.26
*14	17.34.10	17.30.14	17.26.18	17.22.22	17.18.26	17.14.30	17.10.34	17. 6.38
*15	18. 7.49	18. 3.53	17.59.57	17 56. 1	17.52. 5	17.48. 9	17.44.13	17.40.18
*16	18.25.34	18.21.38	18.17.42	18.13.46	18. 9.50	18. 5.55	18. 1.59	17.58. 3
17	19.11.48	19. 7.52	19. 3.57	19. 0. 1	18.56. 5	18.52. 9	18.48.13	18.44.17
*18	19.18.17	19.14.21	19.10.25	19. 6.29	19. 2.33	18.58.37	18.54.41	18.50.46
19†	19.22.54	19.18.58	19.15. 2	19.11. 6	19. 7.10	19. 3.14	18.59.19	18.55.23
*20	20.58.22	20.54.26	20.50.30	20.46.34	20.42.38	20.38.43	20.34.47	20.30.51
21	21. 6.46	21. 2.50	20.58.55	20.54.59	20.51. 3	20.47. 7	20.43.11	20.39.15
*22†	21.46.48	21.42.52	21.38.56	21.35. 0	21.31. 5	21.27. 9	21.23.13	21.19.17
*23	22.40.39	22.36.43	22.32.47	22.28.51	22.24.55	22.20.59	22.17. 3	22.13. 7
24	23.27.34	23.23.38	23.19.42	23.15.46	23.11.50	23. 7.54	23. 3.58	23. 0. 3
*25	0. 8.16	0. 4.20	0. 0. 24 23. 56. 28	23.52.33	23.48.37	23.44.41	23.40.45	23.36.49
*26†	1. 7. 7	1. 3.11	0.59.15	0,55.19	0.51.23	0.47.28	0.43.32	0.39.36
27	1.31.27	1.27.31	1.23.35	1.19.40	1.15.44	1.11.48	1. 7.52	1. 3.56
*28	1.42.55	1.38.59	1.35. 3	1.31. 7	1.27.11	1.23.15	1.19.19	1.15.23
*29	1.58.33	1.54.37	1.50.41	1.46.45	1.42.49	1.38.53	1.34.57	1.31. 1
*30	2.19. 0	2.15. 4	2.11. 8	2. 7.13	2. 3.17	1.59.21	1.55.25	1.51.29
31	2.58.27	2.54.31	2.50.35	2.46.39	2.42.43	2.38.47	2.34.52	2.30.56
32	3.17.52	3.13.56	3.10. 0	3. 6. 4	3. 2. 8	2.58.12	2.54.16	2.50.20
33	3.26.20	3.22.25	3.18.29	3,14.33	3.10.37	3. 6.41	3. 2.45	2.58.49
*34†	4. 9.29	4. 5.33	4. 1.37	3.57.42	3.53.46	3.49.50	3.45.54	3.41.58
35	4.57. 3	4.53. 7	4.49.11	4.45.15	4.41.19	4.37.23	4.33.27	4.29.31
36	5.17. 9	5.13.13	5. 9.17	5. 5.21	5. 1.25	4.57.29	4.53.33	4.49.37
37	5.42.21	5.38.25	5.34.29	5.30.33	5.26.37	5.22.42	5.18.46	5.14.50
*38	6.20.56	6.17. 0	6.13. 4	6. 9. 8	6. 5.12	6. 1.16	5.57.20	5.53.25
*39†	7.32.15	7.28.19	7.24.23	7.20.27	7.16.32	7.12.36	7, 8.40	7. 4.44
40	8. 2.16	7.58.20	7.54.24	7.50.28	7.46.33	7.42.37	7.38.41	7.34.45
*41	8.25. 3	8.21. 7	8.17.11	8.13.15	8. 9.19	8. 5.24	8. 1.28	7.57.32
42	9.47. 5	9.43. 9	9.39.13	9.35.17	9.31.21	9.27.25	9.23.30	9.19.34
*43†	10.37.35	10.33.39	10.29.44	10.25.48	10.21.52	10.17.56	10.14. 0	10.10. 4
44†	10.45.33	10.41.37	10.37.41	10.33.45	10.29.49	10.25.53	10.21.57	10.18. 1

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

OCTOBER, 1844.

Day.	1	2	3	4	5	6
Eqn. of Time.	10m. 26s. add.	10m. 45s. add.	11m. 3s. add.	11m. 22s. add.	11m. 39s. add.	11m. 57s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	11.17.16	11.13.20	11. 9.24	11. 5.28	11. 1.32	10.57.36
2	11.22. 7	11.18.11	11.14.15	11.10.20	11. 6.24	11. 2.28
3	11.52.35	11.48.39	11.44.43	11.40.47	11.36.51	11.32.56
4	12.17.45	12.13.49	12. 9.53	12. 5.57	12. 2. 1	11.58. 6
*5	12.48.34	12.44.38	12.40.43	12.36.47	12.32.51	12.28.55
6†	13.15. 0	13.11. 4	13. 7. 8	13. 3.12	12.59.16	12.55.20
7	13.28. 2	13.24. 6	13.20.10	13.16.14	13.12.18	13. 8.22
8	14.10.35	14. 6.39	14. 2.43	13.58.47	13.54.51	13.50.55
9	14.29.37	14.25.41	14.21.45	14.17.49	14.13.53	14. 9.57
*10†	15.43 10	15.39.15	15.35.19	15.31.23	15.27.27	15.23.31
*11	16.21.16	16.17.20	16.13.24	16. 9.28	16. 5.32	16. 1.36
*12	16.23. 8	16.19.12	16.15.16	16.11.20	16. 7.24	16. 3.28
13	16.32.30	16.28.34	16.24.38	16.20.42	16.16.46	16.12.50
*14	17. 2.42	16.58.47	16.54.51	16.50.55	16.46.59	16.43. 3
*15	17.36.22	17.32.26	17.28.30	17.24.34	17.20.38	17.16.42
*16	17.54. 7	17.50.11	17.46.15	17.42.19	17.38.23	17.34.27
17	18.40.21	18.36.25	18.32.29	18.28.33	18.24.38	18.20.42
*18	18.46.50	18.42.54	18.38.58	18.35. 2	18.31. 6	18.27.10
19	18.51.27	18.47.31	18.43.35	18.39.39	18.35.43	18.31.47
*20	20.26.55	20.22.59	20.19. 3	20.15. 7	20.11.11	20. 7.15
21	20.35.19	20.31.23	20.27.27	20.23.31	20.19.36	20.15.40
*22†	21.15.21	21.11.25	21. 7.29	21. 3.33	20.59.37	20.55.41
*23	22. 9.12	22. 5.16	22. 1.20	21.57.24	21.53.28	21.49.32
24	22.56. 7	22.52.11	22.48.15	22.44.19	22.40.23	22.36.27
*25	23 32.53	23.28.57	23.25. 1	23.21. 5	23.17. 9	23.13.14
*26†	0.35.40	0.31.44	0.27.48	0.23.52	0.19.56	0.16. 0
27	1. 0. 0	0.56. 4	0.52. 8	0.48.12	0.44.16	0.40.21
*28	1.11.28	1. 7.32	1. 3.36	0.59.40	0.55.44	0.51.48
*29	1.27. 5	1.23. 9	1.19.14	1.15.18	1.11.22	1. 7.26
*30	1.47.33	1.43.37	1.39.41	1.35.45	1.31.49	1.27.54
31	2.27. 0	2.23. 4	2.19. 8	2.15.12	2.11.16	2. 7.20
32	2.46.24	2.42.29	2.38.33	2.34.37	2.30.41	2.26.45
33	2.54.53	2.50.57	2.47. 1	2.43. 6	2.39.10	2.35.14
*34†	3.38. 2	3.34. 6	3.30.10	3.26.14	3.22.18	3.18.23
35	4.25.35	4.21.39	4.17.44	4.13.48	4. 9.52	4. 5.56
36	4.45.42	4.41.46	4.37.50	4.33.54	4.29.58	4.26. 2
37	5.10.54	5. 6.58	5. 3. 2	4.59. 6	4.55.10	4.51.14
*38	5.49.29	5.45.33	5.41.37	5.37.41	5.33.45	5.29.49
*39†	7. 0.48	6.56.52	6.52.56	6.49. 0	6.45. 4	6.41. 8
40	7.30.49	7.26.53	7.22.57	7.19. 1	7.15. 5	7.11. 9
*41	7.53.36	7.49.40	7.45.44	7.41.48	7.37.52	7.33.56
42	9.15.38	9.11.42	9. 7.46	9. 3.50	8.59.54	8.55.58
*43†	10. 6. 8	10. 2.12	9.58.16	9.54.20	9.50.25	9.46.29
44†	10.14. 6	10.10.10	10. 6.14	10. 2.18	9.58.22	9.54.26

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 2	0.16
8	0. 5	0.32
12	0. 7	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.19	2. 8
36	0.22	2.24
40	0.24	2.40
44	0.27	2.56
48	0.29	3.12
52	0.31	3.28
56	0.34	3.44
60	0.36	4. 0
64	0.39	4.16
68	0.41	4.32
72	0.43	4.48
76	0.46	5. 4
80	0.48	5.20
84	0.51	5.36
88	0.53	5.52
92	0.56	6. 8
96	0.58	6.24
100	1. 0	6.40
104	1. 3	6.56
108	1. 5	7.12
112	1. 8	7.28
116	1.10	7.44
120	1.12	8 0
124	1.15	8.16
128	1.17	8.32
132	1.20	8.48
136	1.22	9. 4
140	1.24	9.20
144	1.27	9.36
148	1.29	9.52
152	1.32	10. 8
156	1.34	10.24
160	1.37	10.40
164	1.39	10.56
168	1.41	11.12
172	1.44	11.28
176	1.46	11.44
180	1.49	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

OCTOBER, 1844.

Day.	7	8	9	10	11	12	13	14
Eqn. of Time.	12m. 14s. add.	12m. 30s. add.	12m. 46s. add.	13m. 2s. add.	13m. 17s. add.	13m. 32s. add.	13m. 46s. add.	14m. 0s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	10.53.40	10.49.44	10.45.48	10.41.53	10.37.57	10.34. 1	10.30. 5	10.26. 9
2	10.58.32	10.54.36	10.50.40	10.46.44	10.42.48	10.38.52	10.34.56	10.31. 1
3	11.29. 0	11.25. 4	11.21. 8	11.17.12	11.13 16	11. 9.20	11. 5.24	11. 1.28
4	11.54.10	11.50.14	11.46.18	11.42.22	11.38.26	11.34.30	11.30.34	11.26.38
*5	12.24.59	12.21. 3	12.17. 7	12.13.11	12. 9.15	12. 5.19	12. 1.24	11.57.28
6†	12.51.24	12.47.28	12.43.32	12.39.37	12.35.41	12.31.45	12.27.49	12.23.53
7	13. 4.26	13. 0 30	12.56.34	12.52.38	12.48.43	12.44.47	12.40.51	12.36.55
8	13.47. 0	13.43. 4	13.39. 8	13.35.12	13.31.16	13.27.20	13.23.24	13.19.28
9	14. 6. 1	14. 2. 6	13.58.10	13.54.14	13.50.18	13.46.22	13.42.26	13.38.30
*10†	15.19.35	15.15.39	15.11.43	15. 7.47	15. 3.51	14.59.56	14.56. 0	14.52. 4
*11	15.57.41	15.53.45	15.49.49	15.45.53	15.41.57	15.38. 1	15.34. 5	15.30. 9
*12	15.59.32	15.55.37	15.51.41	15.47.45	15.43.49	15.39.53	15 35.57	15.32. 1
13	16. 8.54	16. 4.59	16. 1. 3	15.57. 7	15.53.11	15.49.15	15.45.19	15.41.23
*14	16.39. 7	16.35.11	16.31.15	16.27.19	16.23.23	16.19.28	16.15.32	16.11.36
*15	17.12.46	17. 8.50	17. 4.54	17. 0.59	16.57. 3	16.53. 7	16.49.11	16.45.15
*16	17.30.31	17.26.36	17.22.40	17.18.44	17.14.48	17.10.52	17. 6.56	17. 3. 0
17	18.16.46	18.12.50	18. 8.54	18. 4.58	18. 1. 2	17.57. 6	17.53.10	17.49.14
*18	18.23.14	18.19.18	18.15.22	18.11.27	18. 7.31	18. 3.35	17.59.39	17.55.43
19†	18.27.51	18.23.55	18.20. 0	18.16. 4	18.12. 8	18. 8.12	18. 4.16	18. 0.20
*20	20. 3.19	19.59.24	19.55.28	19.51.32	19.47.36	19.43.40	19.39.44	19.35.48
21	20.11.44	20. 7.48	20. 3.52	19.59.56	19.56. 0	19.52. 4	19.48. 8	19.44.12
*22†	20.51.46	20.47.50	20.43.54	20.39.58	20.36. 2	20.32. 6	20.28.10	20.24.14
*23	21.45.36	21.41.40	21.37.44	21.33.48	21.29.53	21.25.57	21.22. 1	21.18. 5
24	22.32.31	22.28.35	22.24.39	22.20.44	22.16.48	22.12.52	22. 8.56	22. 5. 0
*25	23. 9.18	23. 5.22	23. 1.26	22.57.30	22.53.34	22.49.38	22.45.42	22.41.46
*26†	0.12. 4	0. 8. 9	0. 4.13	0. 0. 17 23.56.21	23.52.25	23.48.29	23.44.33	23.40.37
27	0.36.25	0.32.29	0.28.33	0.24.37	0.20.41	0.16.45	0.12.49	0. 8.53
*28	0.47.52	0.43.56	0.40. 0	0.36. 4	0.32. 9	0.28.13	0.24.17	0.20.21
*29	1. 3.30	0.59.34	0.55.38	0.51.42	0.47.46	0.43.50	0.39.55	0.35.59
*30	1.23.58	1.20. 2	1.16. 6	1.12.10	1. 8.14	1. 4.18	1. 0.22	0.56.26
31	2. 3.24	1.59.28	1.55.33	1.51.37	1.47.41	1.43.45	1.39.49	1.35.53
32	2.22.49	2.18.53	2.14.57	2.11. 1	2. 7. 5	2. 3.10	1.59.14	1.55.18
33	2.31.18	2.27.22	2.23.26	2.19.30	2.15.34	2.11.38	2. 7.42	2. 3.47
*34†	3.14.27	3.10.31	3. 6.35	3. 2.39	2.58.43	2.54.47	2.50.51	2.46.55
35	4. 2. 0	3.58. 4	3.54. 8	3.50.12	3.46.16	3.42.20	3.38.25	3.34.29
36	4.22. 6	4.18.10	4.14.14	4.10.18	4. 6.23	4. 2.27	3.58.31	3.54.35
37	4.47.18	4.43.23	4.39.27	4.35.31	4.31.35	4.27.39	4.23.43	4 19.47
*38	5.25.53	5.21.57	5.18. 1	5.14. 6	5.10.10	5. 6.14	5. 2.18	4.58.22
*39†	6.37.13	6.33.17	6.29.21	6.25.25	6.21.29	6.17.33	6.13.37	6. 9.41
40	7. 7.14	7. 3.18	6.59.22	6.55.26	6.51.30	6.47.34	6.43.38	6.39.42
*41	7.30. 0	7.26. 5	7.22. 9	7.18.13	7.14.17	7.10.21	7. 6.25	7. 2.29
42	8.52. 2	8.48. 6	8.44.11	8.40.15	8.36.19	8.32.23	8.28.27	8.24.31
*43†	9.42.33	9.38.37	9.34.41	9.30.45	9.26.49	9.22.53	9.18.57	9.15. 1
44†	9.50.30	9.46.34	9.42.38	9.38.42	9.34.47	9.30.51	9.26.55	9.22.59

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

OCTOBER, 1844.

Day.	15	16	17	18	19	20
Eqn. of Time.	14m. 13s. add.	14m. 25s. add.	14m. 37s. add.	14m. 49s. add.	14m. 59s. add.	15m. 10s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	10.22.13	10.18.17	10.14.21	10.10.25	10. 6.29	10. 2.34
2	10.27. 5	10.23. 9	10.19.13	10.15.17	10.11.21	10. 7.25
3	10.57.32	10.53.37	10.49.41	10.45.45	10.41.49	10.37.53
4	11.22.42	11.18.47	11.14.51	11.10.55	11. 6.59	11. 3. 3
*5	11.53.32	11.49.36	11.45.40	11.41.44	11.37.48	11.33.52
6†	12.19.57	12.16. 1	12.12. 5	12. 8. 9	12. 4.13	12. 0.18
7	12.32.59	12.29. 3	12.25. 7	12.21.11	12.17.15	12.13.19
8	13.15.32	13.11.36	13. 7.41	13. 3.45	12.59.49	12.55.53
9	13.34.34	13.30.38	13.26.42	13.22.47	13.18.51	13.14.55
*10†	14.48. 8	14.44.12	14.40.16	14.36.20	14.32.24	14.28.28
*11	15.26.13	15.22.18	15.18.22	15.14.26	15.10.30	15. 6.34
*12	15.28. 5	15.24. 9	15.20.13	15.16.18	15.12.22	15. 8.26
13	15.37.27	15.33.31	15.29.35	15.25.40	15.21.44	15.17.48
*14	16. 7.40	16. 3.44	15.59.48	15.55.52	15.51.56	15.48. 0
*15	16.41.19	16.37.23	16.33.27	16.29.31	16.25.35	16.21.40
*16	16.59. 4	16.55. 8	16.51.12	16.47.17	16.43.21	16.39.25
17	17.45.19	17.41.23	17.37.27	17.33.31	17.29.35	17.25.39
*18	17.51.47	17.47.51	17.43.55	17.39.59	17.36. 3	17.32. 8
19†	17.56.24	17.52.28	17.48.32	17.44.36	17.40.41	17.36.45
*20	19.31.52	19.27.56	19.24. 0	19.20. 5	19.16. 9	19.12.13
21	19.40.17	19.36 21	19.32.25	19.28.29	19.24.33	19.20.37
*22†	20.20.18	20.16.22	20.12.27	20. 8.31	20. 4.35	20. 0.39
*23	21.14. 9	21.10.13	21. 6.17	21. 2.21	20.58.25	20.54.29
24	22. 1. 4	21.57. 8	21.53.12	21.49.16	21.45.20	21.41.25
*25	22.37.50	22.33.55	22.29.59	22.26. 3	22.22. 7	22.18.11
*26†	23.36.41	23.32.45	23.28.50	23.24.54	23.20.58	23.17. 2
27	0. 4.57	0. 1. 2 23. 57. 6	23.53.10	23.49.14	23.45.18	23.41.22
*28	0.16.25	0.12.29	0. 8.33	0. 4.37	0. 0. 41 23. 56. 45	23.52.50
*29	0.32. 3	0.28. 7	0.24.11	0.20.15	0.16.19	0.12.23
*30	0.52.30	0.48.35	0.44.39	0.40.43	0.36.47	0.32.51
31	1.31.57	1.28. 1	1.24. 5	1.20. 9	1.16.14	1.12.18
32	1.51.22	1.47.26	1.43.30	1.39.34	1.35.38	1.31.42
33	1.59.51	1.55.55	1.51.59	1.48. 3	1.44. 7	1.40.11
*34†	2.42.59	2.39. 4	2.35. 8	2.31.12	2.27.16	2.23.20
35	3.30.33	3.26.37	3.22.41	3.18.45	3.14.49	3.10.53
36	3.50.39	3.46.43	3.42.47	3.38.51	3.34.55	3.30.59
37	4.15.51	4.11.55	4. 7.59	4. 4. 4	4. 0. 8	3.56.12
*38	4.54.26	4.50.30	4.46.34	4.42.38	4.38.42	4.34.47
*39†	6. 5.45	6. 1.49	5.57.54	5.53.58	5.50. 2	5.46. 6
40	6.35.46	6.31.50	6.27.55	6.23.59	6.20. 3	6.16. 7
*41	6.58.33	6.54.37	6.50.41	6.46.46	6.42.50	5.38.54
42	8.20.35	8.16.39	8.12.43	8. 8.47	8. 4.52	8. 0.56
*43†	9.11. 6	9. 7.10	9. 3.14	8.59.18	8.55.22	8.51.26
44†	9.19. 3	9.15. 7	9.11.11	9. 7.15	9. 3.19	8.59.23

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.12	1.20
24	0.15	1.36
28	0.17	1.52
32	0.20	2. 8
36	0.22	2.24
40	0.25	2.40
44	0.27	2.56
48	0.30	3.12
52	0.32	3.28
56	0.35	3.44
60	0.37	4. 0
64	0.40	4.16
68	0.42	4.32
72	0.45	4.48
76	0.47	5. 4
80	0.50	5.20
84	0.52	5.36
88	0.55	5.52
92	0.57	6. 8
96	1. 0	6.24
100	1. 2	6.40
104	1. 4	6.56
108	1. 7	7.12
112	1. 9	7.28
116	1.12	7.44
120	1.14	8. 0
124	1.17	8.16
128	1.19	8.32
132	1.22	8.48
136	1.24	9. 4
140	1.27	9.20
144	1.29	9.36
148	1.32	9.52
152	1.34	10. 8
156	1.37	10.24
160	1.39	10.40
164	1.42	10.56
168	1.44	11.12
172	1.47	11.28
176	1.49	11.44
180	1.52	12. 0

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

OCTOBER, 1844.

Day.	21	22	23	24	25	26	27	28
Eqn. of Time.	15m. 19s. add.	15m. 28s. add.	15m. 36s. add.	15m. 44s. add.	15m. 51s. add.	15m. 57s. add.	16m. 2s. add.	16m. 7s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	9.58.38	9.54.42	9.50.46	9.46.50	9.42.54	9.38.58	9.35. 2	9.31. 6
2	10. 3.29	9.59.33	9.55.37	9.51.42	9.47.46	9.43.50	9.39.54	9.35.58
3	10.33.57	10.30. 1	10.26. 5	10,22 9	10.18.13	10.14.18	10.10.22	10. 6.26
4	10.59. 7	10.55.11	10.51.15	10.47.19	10.43.23	10·39.28	10.35.32	10.31.36
*5	11.29.56	11.26. 0	11.22. 5	11.18. 9	11.14.13	11.10.17	11. 6.21	11. 2.25
6†	11.56.22	11.52.26	11.48.30	11.44.34	11.40.38	11.36.42	11.32.46	11.28.50
7	12. 9.24	12. 5.28	12. 1.32	11.57.36	11.53.40	11.49.44	11.45.48	11.41.52
8	12.51.57	12.48. 1	12.44. 5	12.40. 9	12;36.13	12.32.17	12.28.22	12.24.26
9	13.10.59	13. 7. 3	13. 3. 7	12.59.11	12.55.15	12.51.19	12.47.23	12.43.28
*10†	14.24.32	14.20.37	14.16.41	14.12.45	14. 8.49	14. 4.53	14. 0.57	13.57. 1
*11	15. 2.38	14.58.42	14.54.46	14.50.50	14.46.54	14.42.59	14.39. 3	14.35. 7
*12	15. 4.30	15. 0,34	14.56.38	14.52.42	14,48.46	14.44.50	14.40.54	14.36.59
13	15.13.52	15. 9.56	15. 6. 0	15. 2. 4	14.58. 8	14.54.12	14.50.16	14.46.21
*14	15.44. 4	15.40. 9	15.36.13	15.32.17	15.28.21	15.24.25	15.20.29	15.16.33
*15	16.17.44	16.13.48	16. 9.52	16. 5.56	16. 2. 0	15.58. 4	15.54. 8	15.50.12
*16	16.35.29	16.31.33	16.27.37	16.23.41	16.19.45	16.15.49	16.11.53	16. 7.58
17	17.21.43	17.17.47	17.13.51	17. 9.55	17. 6. 0	17. 2. 4	16 58. 8	16.54.12
*18	17.28.12	17.24.16	17.20.20	17.16.24	17.12.28	17. 8.32	17. 4.36	17. 0.40
19†	17.32.49	17.28.53	17.24.57	17.21. 1	17.17. 5	17.13. 9	17. 9.13	17. 5.17
*20	19. 8.17	19. 4.21	19. 0.25	18.56.29	18.52.33	18.48.37	18.44.41	18.40.46
21	19.16.41	19.12.45	19. 8.49	19. 4.53	19. 0.58	18.57. 2	18.53. 6	18.49.10
*22†	19.56.43	19.52.47	19.48.51	19.44.55	19.40.59	19.37. 3	19.33. 8	19.29.12
*23	20.50.34	20.46.38	20.42.42	20.38.46	20.34.50	20.30.54	20.26.58	20.23. 2
24	21.37.29	21.33.33	21.29.37	21.25.41	21.21.45	21.17.49	21.13.53	21. 9.57
*25	22.14.15	22.10.19	22. 6.23	22. 2.27	21.58.31	21.54.36	21.50.40	21.46.44
*26†	23.13. 6	23. 9.10	23. 5.14	23. 1.18	22.57.22	22.53.26	22.49.31	22.45.35
27	23.37.26	23.33.30	23.29.34	23.25.38	23.21.43	23.17.47	23.13.51	23. 9.55
*28	23.48.54	23.44.58	23.41. 2	23.37. 6	23.33.10	23.29.14	23.25.18	23.21.22
*29	0. 8.27	0. 4.31	0. 0. 36 23. 56. 40	23.52.44	23.48.48	23.44.52	23.40.56	23.37. 0
*30	0.28.55	0.24.59	0.21. 3	0.17. 7	0.13.11	0. 9.16	0. 5.20	0. 1. 24 23. 57. 28
31	1. 8.22	1. 4.26	1. 0.30	0.56.34	0.52.38	0.48.42	0.44.46	0.40.50
32	1.27.46	1.23.51	1.19.55	1.15.59	1.12. 3	1. 8. 7	1. 4.11	1. 0.15
33	1.36.15	1.32.19	1.28.23	1.24.28	1.20.32	1.16.36	1.12.40	1. 8.44
*34†	2.19.24	2.15.28	2.11.32	2. 7.36	2. 3.40	1.59.45	1.55.49	1.51.53
35	3. 6.57	3. 3. 1	2.59. 6	2.55.10	2.51.14	2.47.18	2.43.22	2.39.26
36	3.27. 4	3.23. 8	3.19.12	3.15.16	3.11.20	3. 7.24	3. 3.28	2.59.32
37	3.52.16	3.48 20	3.44.24	3.40.28	3.36.32	3.32.36	3.28.40	3.24.45
*38	4.30.51	4.26.55	4.22.59	4.19. 3	4.15. 7	4.11.11	4. 7.15	4. 3.19
*39†	5.42.10	5.38.14	5.34.18	5.30.22	5.26.26	5.22.30	5.18.35	5.14.39
40	6.12.11	6. 8.15	6. 4.19	6. 0.23	5.56.27	5.52 31	5.48.36	5.44.40
*41	6.34.58	6.31. 2	6.27. 6	6.23.10	6.19.14	6.15.18	6.11.22	6. 7.27
42	7.57. 0	7.53. 4	7.49. 8	7.45.12	7.41.16	7.37.20	7.33.24	7.29.28
*43†	8.47.30	8.43.34	8.39.38	8.35.42	8.31.47	8.27.51	8.23.55	8.19.59
44†	8.55.28	8.51.32	8.47.36	8.43.40	8.39.44	8.35.48	8.31.52	8.27.56

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

OCTOBER. 1844. NOVEMBER.

Day.	29	30	31	1	2	3
Eqn. of Time.	16m. 10s. add.	16m. 14s. add.	16m. 16s. add.	16m. 17s. add.	16m. 18s. add.	16m. 18s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	9.27.10	9.23.15	9.19.19	9.15.23	9.11.27	9. 7.31
2	9.32. 2	9.28. 6	9.24.10	9.20.14	9.16.18	9.12.23
3	10. 2.30	9.58.34	9.54.38	9.50.42	9.46.46	9.42.50
4	10.27.40	10.23.44	10.19.48	10.15.52	10.11.56	10. 8. 0
*5	10.58.29	10.54.33	10.50.37	10.46.41	10.42.46	10.38.50
6†	11.24.54	11.20.59	11.17. 3	11.13. 7	11. 9.11	11. 5.15
7	11.37.56	11.34. 0	11.30. 5	11.26. 9	11.22.13	11.18.17
8	12.20.30	12.16.34	12.12.38	12. 8.42	12. 4.46	12. 0.50
9	12.39.32	12.35.36	12.31.40	12.27.44	12.23.48	12.19.52
*10†	13.53. 5	13.49. 9	13.45.13	13.41.18	13.37.22	13.33.26
*11	14.31.11	14.27.15	14.23.19	14.19.23	14.15.27	14.11.31
*12	14.33. 3	14.29. 7	14.25.11	14.21.15	14.17.19	14.13.23
13	14.42.25	14.38.29	14.34.33	14.30.37	14.26.41	14.22.45
*14	15.12.37	15. 8.41	15. 4.45	15. 0.50	14.56.54	14.52.58
*15	15.46.16	15.42.21	15.38.25	15.34.29	15.30.33	15.26.37
*16	16. 4. 2	16. 0. 6	15.56.10	15.52.14	15.48.18	15.44.22
17	16.50.16	16.46.20	16.42.24	16.38.28	16.34.32	16.30.36
*18	16.56.44	16.52.49	16.48.53	16.44.57	16.41. 1	16.37. 5
19†	17. 1.22	16.57.26	16.53.30	16.49.34	16.45.38	16.41.42
*20	18.36.50	18.32.54	18.28.58	18.25. 2	18.21. 6	18.17.10
21	18.45.14	18.41.18	18.37.22	18.33.26	18.29.30	18.25.34
*22†	19.25.16	19.21.20	19.17.24	19.13.28	19. 9.32	19. 5.36
*23	20.19. 6	20.15.10	20.11.15	20. 7.19	20. 3.23	19.59.27
24	21. 6. 1	21. 2. 6	20.58.10	20.54.14	20.50.18	20.46.22
*25	21.42.48	21.38.52	21.34.56	21.31. 0	21.27. 4	21.23. 8
*26†	22.41.39	22.37.43	22.33.47	22.29.51	22.25.55	22.21.59
27	23. 5.59	23. 2. 3	22.58. 7	22.54.11	22.50.15	22.46.19
*28	23.17.26	23.13.31	23. 9.35	23. 5.39	23. 1.43	22.57.47
*29	23.33. 4	23.29. 8	23.25.12	23.21.17	23.17.21	23.13.25
*30	23.53.32	23.49.36	23.45.40	23.41.44	23.37.48	23.33.52
31	0.36.55	0.32.59	0.29. 3	0.25. 7	0.21.11	0.17.15
32	0.56.19	0.52.23	0.48.27	0.44.32	0.40.36	0.36.40
33	1. 4.48	1. 0.52	0.56.56	0.53. 0	0.49. 4	0.45. 9
*34†	1.47.57	1.44. 1	1.40. 5	1.36. 9	1.32.13	1.28.17
35	2.35.30	2.31.34	2.27.38	2.23.42	2.19.47	2.15.51
36	2.55.36	2.51.40	2.47.45	2.43.49	2.39.53	2.35.57
37	3.20.49	3.16.53	3.12.57	3. 9. 1	3. 5. 5	3. 1. 9
*38	3.59.23	3.55.28	3.51.32	3.47.36	3.43.40	3.39.44
*39†	5.10.43	5. 6.47	5. 2.51	4.58.55	4.54.59	4.51. 3
40	5.40.44	5.36.48	5.32.52	5.28.56	5.25. 0	.5.21. 4
*41	6. 3.31	5.59.35	5.55.39	5.51.43	5.47.47	5.43.51
42	7.25.33	7.21.37	7.17.41	7.13.45	7. 9.49	7. 5.53
*43†	8.16. 3	8.12. 7	8. 8.11	8. 4.15	8. 0.19	7.56.23
44†	8.24. 0	8.20. 4	8.16. 9	8.12.13	8. 8.17	8. 4.21

TABLE C.

Longitude.	Sub. W. Add E.	Time.
o	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.10	1. 4
20	0.13	1.20
24	0.16	1.36
28	0.18	1.52
32	0.21	2. 8
36	0.23	2.24
40	0.26	2.40
44	0.28	2.56
48	0.31	3.12
52	0.34	3.28
56	0.36	3.44
60	0.39	4. 0
64	0.41	4.16
68	0.44	4.32
72	0.46	4.48
76	0.49	5. 4
80	0.52	5.20
84	0.54	5.36
88	0.57	5.52
92	0.59	6. 8
96	1. 2	6.24
100	1. 4	6.40
104	1. 7	6.56
108	1.10	7.12
112	1.12	7.28
116	1.15	7.44
120	1.17	8 0
124	1.20	8.16
128	1.23	8.32
132	1.25	8.48
136	1.28	9. 4
140	1.30	9.20
144	1.33	9.36
148	1.35	9.52
152	1.38	10. 8
156	1.41	10.24
160	1.43	10.40
164	1.46	10.56
168	1.48	11.12
172	1.51	11.28
176	1.53	11.44
180	1.56	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

NOVEMBER, 1844.

Day.	4	5	6	7	8	9	10	11
Eqn. of Time.	16m. 17s. add.	16m. 15s. add.	16m. 12s. add.	16m. 8s. add.	16m. 4s. add.	15m 59s. add.	15m. 53s. add.	15m. 46s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S
*1	9. 3.35	8.59.39	8.55.43	8.51.47	8.47 51	8.43.56	8.40. 0	8.36. 4
2	9. 8.27	9. 4.31	9. 0.35	8 56.39	8.52.43	8.48.47	8.44.51	8.40.55
3	9.38.54	9.34.59	9.31. 3	9.27. 7	9.23.11	9.19.15	9.15.19	9.11.23
4	10. 4. 4	10. 0. 9	9 56.13	9.52.17	9.48.21	9.44.25	9.40.29	9.36.33
*5	10.34.54	10.30.58	10.27. 2	10.23. 6	10.19.10	10.15.14	10.11.18	10. 7.22
6†	11. 1.19	10.57.23	10.53.27	10.49.31	10.45.35	10.41.40	10.37.44	10.33.48
7	11.14.21	11.10.25	11. 6.29	11. 2.33	10.58.37	10.54.41	10.50.46	10.46.50
8	11.56.54	11.52.58	11.49. 3	11.45. 7	11.41.11	11.37.15	11.33.19	11.29.23
9	12 15.56	12.12. 0	12. 8. 4	12. 4. 9	12. 0.13	11.56.17	11.52.21	11.48.25
*10†	13.29.30	13.25.34	13.21.38	13.17.42	13.13.46	13. 9.50	13. 5.54	13. 1.59
*11	14. 7.35	14. 3.40	13.59.44	13.55.48	13.51.52	13.47.56	13.44. 0	13.40. 4
*12	14. 9.27	14. 5.31	14. 1.35	13.57.40	13.53.44	13.49.48	13.45.52	13.41.56
13	14.18.49	14.14 53	14.10.57	14. 7. 2	14. 3. 6	13.59.10	13.55.14	13.51.18
*14	14.49. 2	14.45. 6	14.41,10	14.37.14	14.33.18	14.29.22	14.25.26	14.21.31
*15	15.22.40	15.18.44	15.14.48	15.10.52	15. 6.56	15. 3. 1	14.59. 5	14.55. 9
*16	15.40.26	15.36.30	15 32.34	15.28.39	15.24.43	15.20.47	15.16.51	15.12.55
17	16.26.41	16.22.45	16.18.49	16.14.53	16.10.57	16. 7. 1	16. 3. 5	15.59. 9
*18	16.33. 9	16.29.13	16.25.17	16.21.21	16.17.25	16.13.30	16. 9.34	16. 5.38
19†	16.37.46	16.33.50	16.29.54	16.25.58	16.22. 3	16.18. 7	16.14.11	16.10.15
*20	18.13.13	18. 9.17	18. 5.21	18. 1.26	17.57.30	17.53.34	17.49.38	17.45.42
21	18.21.39	18.17.43	18.13.47	18. 9.51	18. 5.55	18. 1.59	17.58. 3	17.54. 7
*22†	19. 1.40	18.57.44	18.53.49	18.49.53	18.45.57	18.42. 1	18.38. 5	18.34. 9
*23	19.55.31	19.51.35	19.47.39	19.43.43	19.39.47	19.35.51	19.31.56	19.28. 0
24	20.42.26	20.38.30	20.34.34	20.30.38	20.26.42	20.22.47	20.18.51	20.14.55
*25	21.19.12	21.15.17	21.11.21	21. 7.25	21. 3.29	20.59.33	20.55.37	20.51.41
*26†	22.18. 3	22 14. 7	22.10.12	22. 6.16	22. 2.20	21.58.24	21.54.28	21.50.32
27	22.42.24	22.38.28	22.34.32	22.30.36	22.26.40	22.22.44	22.18.48	22.14.52
*28	22.53.51	22.49.55	22.45.59	22.42. 3	22.38. 7	22.34.12	22.30.16	22.26.20
*29	23. 9.29	23. 5.33	23. 1.37	22.57.41	22.53.45	22.49.49	22.45.53	22.41.58
*30	23.29.57	23.26. 1	23.22. 5	23.18. 9	23.14.13	23.10.17	23. 6.21	23. 2.25
31	0.13.19	0. 9.23	0. 5.27	0. 1. 31 23. 57. 36	23.53.40	23.49.44	23.45.48	23.41.52
32	0.32.44	0.28.48	0.24.52	0.20.56	0.17. 0	0.13. 4	0. 9. 8	0. 5.13
33	0.41.13	0.37.17	0.33.21	0.29.25	0.25.29	0.21.33	0.17.37	0.13.41
*34†	1.24.21	1.20.26	1.16.30	1.12.34	1. 8.38	1. 4.42	1. 0.46	0 56.50
35	2.11.55	2. 7.59	2. 4. 3	2. 0. 7	1.56.11	1.52.15	1.48.19	1.44.23
36	2.32. 1	2.28. 5	2.24. 9	2.20.13	2.16.17	2.12.21	2. 8.26	2. 4.30
37	2.57.12	2.53.16	2.49.20	2.45.25	2.41.29	2.37.33	2.33.37	2.29.41
*38	3.35.48	3.31.52	3.27.56	3.24. 0	3.20. 4	3.16. 9	3.12.13	3. 8.17
*39†	4.47. 7	4.43.11	4.39.16	4.35 20	4.31.24	4.27.28	4.23.32	4.19.36
40	5.17. 8	5.13.12	5. 9.17	5. 5.21	5. 1.25	4.57.29	4.53.33	4.49.37
*41	5.39.55	5.35.59	5.32. 3	5.28. 8	5.24.12	5.20.16	5.16.20	5.12.24
42	7. 1.57	6.58. 1	6.54. 5	6.50. 9	6.46.14	6.42.18	6.38.22	6.34.26
*43†	7.52.28	7.48.32	7.44.36	7.40.40	7.36.44	7.32.48	7.28.52	7.24.56
44†	8. 0.25	7.56.29	7.52.33	7.48.37	7.44.41	7.40.45	7.36.50	7.32.54

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

NOVEMBER, 1844.

Day.	12	13	14	15	16	17
Eqn. of Time.	15m. 38s. add.	15m. 29s. add.	15m. 20s. add.	15m. 9s. add.	14m. 58s. add.	14m. 46s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	8.32. 8	8.28.12	8.24.16	8.20.20	8.16.24	8.12.28
2	8.36.59	8.33. 4	8.29. 8	8.25.12	8.21.16	8.17.20
3	9. 7.27	9. 3.31	8.59.35	8.55.40	8.51.44	8.47.48
4	9.32.37	9.28.41	9.24.45	9.20.50	9.16.54	9.12.58
*5	10. 3.27	9.59.31	9.55.35	9.51.39	9.47.43	9.43.47
6†	10.29.52	10.25.56	10.22. 0	10.18. 4	10.14. 8	10.10.12
7	10.42.54	10.38.58	10.35. 2	10.31. 6	10.27.10	10.23.14
8	11.25.27	11.21.31	11.17.35	11.13.39	11. 9.44	11. 5.48
9	11.44.29	11.40.33	11.36.37	11.32.41	11.28.45	11.24.50
*10†	12.58. 3	12.54. 7	12.50.11	12.46.15	12.42.19	12.38.23
*11	13.36. 8	13.32.12	13.28.16	13.24.21	13.20.25	13.16.29
*12	13.38. 0	13.34. 4	13.30. 8	13.26.12	13.22.16	13.18.21
13	13.47.22	13.43.26	13.39.30	13.35.34	13.31.38	13.27.43
*14	14.17.35	14.13.39	14. 9.43	14. 5.47	14. 1.51	13.57.55
*15	14.51.13	14.47.17	14.43.21	14.39.25	14.35.29	14.31.33
*16	15. 8.59	15. 5. 3	15. 1. 7	14.57.11	14.53.15	14.49.20
17	15.55.13	15.51.17	15.47.22	15.43.26	15.39.30	15.35.34
*18	16. 1.42	15.57.46	15.53.50	15.49.54	15.45.58	15.42. 2
19†	16. 6.19	16. 2.23	15.58.27	15.54.31	15.50.35	15.46.39
*20	17.41.46	17.37.50	17.33.54	17.29.58	17.26. 2	17.22. 7
21	17.50.11	17.46.15	17.42.20	17.38.24	17.34.28	17.30.32
*22†	18.30.13	18.26.17	18.22.21	18.18.25	18.14.30	18.10.34
*23	19.24. 4	19.20. 8	19.16.12	19.12.16	19. 8.20	19. 4.24
24	20.10.59	20. 7. 3	20. 3. 7	19.59.11	19.55.15	19.51.19
*25	20.47.45	20.43.49	20.39.53	20.35.58	20.32. 2	20.28. 6
*26†	21.46.36	21.42.40	21.38.44	21.34.48	21.30.53	21.26.57
27	22.10.56	22. 7. 0	22. 3. 5	21.59. 9	21.55.13	21.51.17
*28	22.22.24	22.18.28	22.14.32	22.10.36	22. 6.40	22. 2.44
*29	22.38. 2	22.34. 6	22.30.10	22.26.14	22.22.18	22.18.22
*30	22.58.29	22.54.33	22.50.38	22.46.42	22.42.46	22.38.50
31	23.37.56	23.34. 0	23.30. 4	23.26. 8	23.22.12	23.18.17
32	0. 1. 17 23. 57. 21	23.53.25	23.49.29	23.45.33	23.41.37	23.37.41
33	0. 9.45	0. 5.50	0. 1. 54 23. 57. 58	23.54. 2	23.50. 6	23.46.10
*34†	0.52.54	0.48.58	0.45. 2	0.41. 7	0.37.11	0.33.15
35	1.40.28	1.36.32	1.32.36	1.28.40	1.24.44	1.20.48
36	2. 0.34	1.56.38	1.52.42	1.48.46	1.44.50	1.40.54
37	2.25.45	2.21.49	2.17.53	2.13.57	2.10. 1	2. 6. 6
*38	3. 4.21	3. 0.25	2.56.29	2.52.33	2.48.37	2.44.41
*39†	4.15.40	4.11.44	4. 7.48	4. 3.52	3.59.57	3.56. 1
40	4.45.41	4.41.45	4.37.49	4.33.53	4.29.58	4.26. 2
*41	5. 8.28	5. 4.32	5. 0.36	4.56.40	4.52.44	4.48.49
42	6.30.30	6.26.34	6.22.38	6.18.42	6.14.46	6.10.50
*43†	7.21. 0	7.17. 4	7.13. 9	7. 9.13	7. 5.17	7. 1.21
44†	7.28.58	7.25. 2	7.21. 6	7.17.10	7.13.14	7. 9.18

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 5	0.32
12	0. 8	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.16	1.36
28	0.19	1.52
32	0.22	2. 8
36	0.24	2.24
40	0.27	2.40
44	0.30	2.56
48	0.32	3.12
52	0.35	3.28
56	0.38	3.44
60	0.41	4. 0
64	0.43	4.16
68	0.46	4.32
72	0.49	4.48
76	0.51	5. 4
80	0.54	5.20
84	0.57	5.36
88	0.59	5.52
92	1. 2	6. 8
96	1. 5	6.24
100	1. 8	6.40
104	1.10	6.56
108	1.13	7.12
112	1.16	7.28
116	1.18	7.44
120	1.21	8. 0
124	1.24	8.16
128	1.26	8.32
132	1.29	8.48
136	1.32	9. 4
140	1.35	9.20
144	1.37	9.36
148	1.40	9.52
152	1.43	10. 8
156	1.45	10.24
160	1.48	10.40
164	1.51	10.56
168	1.53	11.12
172	1.56	11.28
176	1.59	11.44
180	2. 2	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

NOVEMBER, 1844.

Day.	18	19	20	21	22	23	24	25
Eqn. of Time.	14m. 33s. add.	14m. 20s. add.	14m. 5s. add.	13m. 50s. add.	13m. 34s. add.	13m. 17s. add.	13m. 0s. add.	12m. 42s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
•1	8. 8.32	8. 4.37	8. 0.41	7.56.45	7.52.49	7.48.53	7.44.57	7.41. 1
2	8.13.24	8. 9.28	8. 5.32	8. 1.36	7.57.40	7.53.45	7.49.49	7.45.53
3	8.43.52	8.39.56	8.36. 0	8.32. 4	8.28. 8	8.24.12	8.20.16	8.16.21
4	9. 9. 2	9. 5. 6	9. 1.10	8.57.14	8.53.18	8.49.22	8.45.26	8.41.31
•5	9.39.51	9.35.55	9.31.59	9.28. 3	9.24. 8	9.20.12	9.16.16	9.12.20
6†	10. 6.16	10. 2.21	9.58.25	9.54.29	9.50.33	9.46.37	9.42.41	8.38.45
7	10.19.18	10.15.22	10.11.27	10. 7.31	10. 3.35	9.59.39	9.55.43	9.51.47
8	11. 1.52	10.57.56	10.54. 0	10.50. 4	10.46. 8	10.42.12	10.38.16	10.34.20
9	11.20.54	11.16.58	11.13. 2	11. 9. 6	11. 5.10	11. 1.14	10.57.18	10.53.22
•10†	12.34.27	12.30.31	12.26.35	12.22.40	12.18.44	12.14.48	12.10.52	12. 6.56
•11	13.12.33	13. 8.37	13. 4.41	13. 0.45	12.56.49	12.52.53	12.48.57	12.45. 2
•12	13.14.25	13.10.29	13. 6.33	13. 2.37	12.58.41	12.54.45	12.50.49	12.46.53
13	13.23.47	13.19 51	13.15.55	13.11.59	13. 8. 3	13. 4. 7	13. 0.11	12.56.15
•14	13.53.59	13.50. 3	13.46. 7	13.42.12	13.38.16	13.34.20	13.30.24	13.26.28
•15	14.27.37	14.23.42	14.19.46	14.15.50	14.11.54	14. 7.58	14. 4. 2	14. 0. 6
•16	14.45.24	14.41.28	14.37.32	14.33.36	14.29.40	14.25.44	14.21.48	14.17.52
17	15.31.38	15.27.42	15.23.46	15.19.50	15.15.54	15.11.58	15. 8. 3	15. 4. 7
•18	15.38. 6	15.34.11	15.30.15	15.26.19	15.22.23	15.18.27	15.14.31	15.10.35
19†	15.42.44	15.38.48	15.34.52	15.30.56	15.27. 0	15.23. 4	15.19. 8	15.15.12
•20	17.18.11	17.14.15	17.10.19	17. 6.23	17. 2.27	16.58.31	16.54.35	16.50.39
21	17.26.36	17.22.40	17.18.44	17.14.48	17.10 52	17. 6.56	17. 3. 1	16.59. 5
•22†	18. 6.38	18. 2.42	17.58.46	17.54.50	17.50.54	17.46.58	17.43. 2	17.39. 6
•23	19. 0.28	18.56.32	18.52.37	18.48.41	18.44.45	18.40.49	18.36.53	18.32.57
24	19.47.23	19.43.28	19.39.32	19.35.36	19.31.40	19.27.44	19.23.48	19.19.52
•25	20.24.10	20.20.14	20 16.18	20.12.22	20. 8.26	20. 4.30	20. 0.34	19.56.39
•26†	21.23. 1	21.19. 5	21.15. 9	21.11.13	21. 7.17	21. 3.21	20.59.25	20.55.29
27	21.47.21	21.43.25	21.39.29	21.35.33	21.31.37	21.27.41	21.23.46	21.19.50
•28	21.58.48	21.54.53	21.50.57	21.47. 1	21.43. 5	21.39. 9	21.35.13	21.31.17
•29	22.14.26	22.10.30	22. 6.34	22. 2.39	21.58.43	21.54.47	21.50.51	21.46.55
•30	22.34.54	22.30.58	22.27. 2	22.23. 6	22.19.10	22.15.14	22.11.19	22. 7.23
31	23.14.21	23.10.25	23. 6.29	23. 2.33	22.58.37	22.54.41	22.50.45	22.46.49
32	23.33.45	23.29.49	23.25.54	23.21.58	23.18. 2	23.14. 6	23.10.10	23. 6.14
33	23.42.14	23.38.18	23.34.22	23.30.26	23.26.31	23.22.35	23.18.39	23.14.43
•34†	0.29.19	0.25.23	0.21.27	0.17.31	0.13.35	0. 9.39	0. 5.43	0. 1.48 23 57.52
35	1.16.52	1.12.56	1. 9. 0	1. 5. 4	1. 1. 9	0.57.13	0.53.17	0.49.21
36	1.36.58	1.33. 2	1.29. 7	1.25.11	1.21.15	1.17.19	1.13.23	1. 9.27
37	2. 2.10	1.58.14	1.54.18	1.50.22	1.46.26	1.42.30	1.38.34	1.34.38
•38	2.40.45	2.36 50	2.32.54	2.28.58	2.25. 2	2.21. 6	2.17.10	2.13.14
•39†	3.52. 5	3.48. 9	3.44.13	3.40.17	3.36.21	3.32.25	3.28.29	3.24.33
40	4.22. 6	4.18.10	4.14.14	4.10.18	4. 6.22	4. 2.26	3.58.30	3.54.34
•41	4.44.53	4.40.57	4.37. 1	4.33. 5	4.29. 9	4.25.13	4.21.17	4.17.21
42	6. 6.55	6. 2.59	5.59. 3	5.55. 7	5.51.11	5.47.15	5.43.19	5 39.23
•43†	6.57.25	6.53.29	6.49.33	6.45.37	6.41.41	6.37.45	6.33.50	6.29.54
44†	7. 5.22	7. 1.26	6.57.31	6.53.35	6.49.39	6.45.43	6.41.47	6.37.51

• Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

NOVEMBER, 1844.

Day.	26	27	28	29	30	1
Eqn. of Time.	12m. 23s. add.	12m. 3s. add.	11m. 42s. add.	11m. 21s. add.	10m. 59s. add.	10m. 37s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	7.37. 5	7.33. 9	7.29.13	7.25.18	7.21.22	7.17.26
2	7.41.57	7.38. 1	7.34. 5	7.30. 9	7.26.13	7 22.17
3	8.12.25	8. 8.29	8. 4.33	8. 0.37	7.56.41	7.52.45
4	8.37.35	8.33.39	8.29.43	8.25.47	8.21.51	8.17.55
*5	9. 8.24	9. 4.28	9. 0.32	8.56.36	8.52.40	8.48.44
6†	9.34.49	9.30.53	9.26.57	9.23. 2	9.19. 6	9.15.10
7	9.47.51	9.43.55	9.39.59	9.36. 3	9.32. 8	9.28.12
8	10.30.25	10.26.29	10.22.33	10.18.37	10.14.41	10.10.45
9	10.49.26	10.45.31	10.41.35	10.37.39	10.33.43	10.29.47
*10†	12. 3. 0	11.59. 4	11.55. 8	11.51.12	11.47.16	11.43.21
*11	12.41. 6	12.37.10	12.33.14	12.29.18	12.25.22	12.21.26
*12	12.42.57	12.39. 2	12.35. 6	12.31.10	12.27.14	12.23.18
13	12.52.19	12.48.24	12.44.28	12.40.32	12.36.36	12.32.40
*14	13.22.32	13.18.36	13.14.40	13.10.44	13. 6.48	13. 2.53
*15	13.56.10	13.52.14	13.48.18	13.44.23	13.40.28	13.36.32
*16	14.13.56	14.10. 1	14. 6. 5	14. 2. 9	13.58.13	13.54.17
17	15. 0.11	14.56.15	14.52.19	14.48.23	14.44.27	14.40.31
*18	15. 6.39	15. 2.43	14.58.47	14.54.52	14.50.56	14.47. 0
19†	15.11.16	15. 7.20	15. 3.25	14.59.29	14.55.33	14.51.37
*20	16.46.43	16.42.48	16.38.52	16.34.56	16.31. 0	16.27. 4
21	16.55. 9	16.51.13	16.47.17	16.43.21	16.39.25	16.35.29
*22†	17.35.11	17.31.15	17.27.19	17.23.23	17.19.27	17.15.31
*23	18.29. 1	18.25. 5	18.21. 9	18.17.13	18.13.18	18. 9.22
24	19.15.56	19.12. 0	19. 8. 4	19. 4. 9	19. 0.13	18.56.17
*25	19.52.43	19.48.47	19.44.51	19.40.55	19.36.59	19.33. 3
*26†	20.51.34	20.47.38	20.43.42	20.39.46	20.35.50	20.31.54
27	21.15.54	21.11.58	21. 8. 2	21. 4. 6	21. 0.10	20.56.14
*28	21.27.21	21.23.25	21.19.29	21.15.34	21.11.38	21. 7.42
*29	21.42.59	21 39. 3	21.35. 7	21.31.11	21.27.15	21.23.20
*30	22. 3.27	21.59.31	21.55.35	21.51.39	21.47.43	21.43.47
31	22.42.53	22.38.58	22.35. 2	22.31. 6	22.27.10	22.23.14
32	23. 2.18	22.58.22	22.54.26	22.50.30	22.46.35	22.42.39
33	23.10.47	23. 6.51	23. 2.55	22.58.59	22.55. 3	22.51. 7
*34†	23.53.56	23.50. 0	23.46. 4	23.42. 8	23.38.12	23.34.16
35	0.45.25	0.41.29	0.37.33	0.33.37	0.29.41	0.25.45
36	1. 5.31	1. 1.35	0.57.39	0.53.43	0.49.48	0.45.52
37	1.30.42	1.26.47	1.22.51	1.18.55	1.14.59	1.11. 3
*38	2. 9.18	2. 5.22	2. 1.26	1.57.31	1.53.35	1.49.39
*39†	3.20.38	3.16.42	3.12.46	3. 8.50	3. 4.54	3. 0.58
40	3.50.39	3.46.43	3.42.47	3.38.51	3.34.55	3.30.59
*41	4.13.25	4. 9.30	4. 5.34	4. 1.38	3.57.42	3.53.46
42	5.35.27	5.31.31	5.27.36	5.23.40	5.19.44	5.15.48
*43†	6.25.58	6.22. 2	6.18. 6	6.14.10	6.10.14	6. 6.18
44†	6.33.55	6.29.59	6.26. 3	6.22. 7	6.18.12	6.14.16

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 9	0.48
16	0.11	1. 4
20	0.14	1.20
24	0.17	1.36
28	0.20	1.52
32	0.23	2. 8
36	0.26	2.24
40	0.28	2.40
44	0.31	2.56
48	0.34	3.12
52	0.37	3.28
56	0.40	3.44
60	0.43	4. 0
64	0.45	4.16
68	0.48	4.32
72	0.51	4.48
76	0.54	5. 4
80	0.57	5.20
84	0.59	5.36
88	1. 2	5.52
92	1. 5	6. 8
96	1. 8	6.24
100	1.11	6.40
104	1.14	6.56
108	1.16	7.12
112	1.19	7.28
116	1.22	7.44
120	1.25	8 0
124	1.28	8.16
128	1.31	8.32
132	1.34	8.48
136	1.36	9. 4
140	1.39	9.20
144	1.42	9.36
148	1.45	9.52
152	1.48	10. 8
156	1.50	10.24
160	1.53	10.40
164	1.56	10.56
168	1.59	11.12
172	2. 2	11.28
176	2. 5	11.44
180	2. 8	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

DECEMBER, 1844.

Day.	2	3	4	5	6	7	8	9
Eqn. of Time.	10m. 14s. add.	9m. 50s. add.	9m. 25s. add.	9m. 0s. add.	8m. 35s. add.	8m. 9s. add.	7m. 42s. add.	7m. 15s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	7.13.30	7. 9.34	7. 5.38	7. 1.42	6.57.46	6.53.50	6.49.54	6.45.59
2	7.18.21	7.14.26	7.10.30	7. 6.34	7. 2.38	6.58.42	6.54.46	6.50.50
3	7.48.49	7.44.53	7.40.57	7.37. 2	7.33. 6	7.29.10	7.25.14	7.21.18
4	8.13.59	8.10. 3	8. 6. 7	8. 2.12	7.58.16	7.54.20	7.50.24	7.46.28
*5	8.44.49	8.40.53	8.36.57	8.33. 1	8.29. 5	8.25. 9	8.21.13	8.17.17
6†	9.11.14	9. 7.18	9. 3.22	8.59.26	8.55.30	8.51.34	8.47.38	8.43.43
7	9.24.16	9.20.20	9.16.24	9.12.28	9. 8.32	9. 4.36	9. 0.40	8.56.44
8	10. 6.49	10. 2.53	9.58.57	9.55. 1	9.51. 6	9.47.10	9.43.14	9.39.18
9	10.25.51	10.21.55	10.17.59	10.14. 3	10.10. 7	10. 6.12	10. 2.16	9.58.20
*10†	11.39.25	11.35.29	11.31.33	11.27.37	11.23.41	11.19.45	11.15.49	11.11.53
*11	12.17.30	12.13.34	12. 9.38	12. 5.43	12. 1.47	11.57.51	11.53.55	11.49.59
*12	12.19.22	12.15.26	12.11.30	12. 7.34	12. 3.38	11.59.43	11.55.47	11.51.51
13	12.28.44	12.24.48	12.20.52	12.16.56	12.13. 0	12. 9. 5	12. 5. 9	12. 1.13
*14	12.58.57	12.55. 1	12.51. 5	12.47. 9	12.43.13	12.39.17	12.35.21	12.31.25
*15	13.32.36	13.28.40	13.24.44	13.20.48	13.16.52	13.12.56	13. 9. 0	13. 5. 4
*16	13.50.21	13.46.25	13.42.29	13.38.33	13.34.37	13.30.42	13.26.46	13.22.50
17	14.36.35	14.32.39	14.28.44	14.24.48	14.20.52	14.16.56	14.13. 0	14. 9. 4
*18	14.43. 4	14.39. 8	14.35.12	14.31.16	14.27.20	14.23.24	14.19.28	14.15.33
19†	14.47.41	14.43.45	14.39.49	14.35.53	14.31.57	14.28. 1	14.24. 6	14.20.10
*20	16.23. 8	16.19.12	16.15.16	16.11.20	16. 7.24	16. 3.28	15.59.33	15.55.37
21	16.31.33	16.27.37	16.23.42	16.19.46	16.15.50	16.11.54	16. 7.58	16. 4. 2
*22†	17.11.35	17. 7.39	17. 3.43	16.59.47	16.55.52	16.51.56	16.48. 0	16.44. 4
*23	18. 5.26	18. 1.30	17.57.34	17.53.38	17.49.42	17.45.46	17.41.50	17.37.54
24	18.52.21	18.48.25	18.44.29	18.40.33	18.36.37	18.32.41	18.28.45	18.24.50
*25	19.29. 7	19.25.11	19.21.15	19.17.20	19.13.24	19. 9.28	19. 5.32	19. 1.36
*26†	20.27.58	20.24. 2	20.20. 6	20.16.10	20.12.15	20. 8.19	20. 4.23	20. 0.27
27	20.52.18	20.48.22	20.44.27	20.40.31	20.36.35	20.32.39	20.28.43	20.24.47
*28	21. 3.46	20.59.50	20.55.54	20.51.58	20.48. 2	20.44. 6	20.40.10	20.36.15
*29	21.19.24	21.15.28	21.11.32	21. 7.36	21. 3.40	20.59.44	20.55.48	20.51.52
*30	21.39.51	21.35.55	21.32. 0	21.28. 4	21.24. 8	21.20.12	21.16.16	21.12.20
31	22.19.18	22.15.22	22.11.26	22. 7.30	22. 3.34	21.59.39	21.55.43	21.51.47
32	22.38.43	22.34.47	22.30.51	22.26.55	22.22.59	22.19. 3	22.15. 7	22.11.11
33	22.47.12	22.43.16	22.39.20	22.35.24	22.31.28	22.27.32	22.23.36	22.19.40
*34†	23.30.20	23.26.24	23.22.29	23.18.33	23.14.37	23.10.41	23. 6.45	23. 2.49
35	0.21.50	0.17.54	0.13.58	0.10. 2	0. 6. 6	0. 2.10 23.58.14	23.54.18	23.50.22
36	0.41.56	0.38. 0	0.34. 4	0.30. 8	0.26.12	0.22.16	0.18.20	0.14.24
37	1. 7. 7	1. 3.11	0.59.15	0.55.19	0.51.23	0.47.28	0.43.32	0.39.36
*38	1.45.43	1.41.47	1.37.51	1.33.55	1.29.59	1.26. 3	1.22. 7	1.18.12
*39†	2.57. 2	2.53. 6	2.49.10	2.45.14	2.41.19	2.37.23	2.33.27	2.29.31
40	3.27. 3	3.23. 7	3.19.11	3.15.15	3.11.20	3. 7.24	3. 3.28	2.59.32
*41	3.49.50	3.45.54	3.41.58	3.38. 2	3.34. 6	3.30.11	3.26.15	3.22.19
42	5.11.52	5. 7.56	5. 4. 0	5. 0. 4	4.56. 8	4.52.12	4.48.17	4.44.21
*43†	6. 2.22	5.58.26	5.54.31	5.50.35	5.46.39	5.42.43	5.38.47	5.34.51
44†	6.10.20	6. 6.24	6. 2.28	5.58.32	5.54.36	5.50.40	5.46.44	5.42.48

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal **Fixed Stars** over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

DECEMBER, 1844.

Day.	10	11	12	13	14	15
Eqn. of Time.	6m. 48s. add.	6m. 20s. add.	5m. 51s. add.	5m. 23s. add.	4m. 54s. add.	4m.25s. add.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	6.42. 3	6.38. 7	6.34.11	6.30.15	6.26.19	6.22.23
2	6.46.54	6.42.58	6.39. 2	6.35. 7	6.31.11	6.27.15
3	7.17.22	7.13.26	7. 9.30	7. 5.34	7. 1.38	6.57.43
4	7.42.32	7.38.36	7·34.40	7.30.44	7.26.48	7.22.53
*5	8.13.21	8. 9.25	8. 5.30	8. 1.34	7.57.38	7.53.42
6†	8.39.47	8.35.51	8.31.55	8.27.59	8.24. 3	8.20. 7
7	8.52.49	8.48.53	8.44.57	8.41 1	8.37. 5	8.33. 9
8	9.35.22	9.31.26	9.27.30	9.23.34	9.19.38	9.15.42
9	9.54.24	9.50.28	9.46.32	9.42.36	9.38.40	9.34.44
*10†	11. 7.57	11. 4. 2	11. 0. 6	10.56.10	10.52.14	10.48.18
*11	11.46. 3	11.42. 7	11.38.11	11.34.15	11.30.19	11.26.24
*12	11.47.55	11.43.59	11.40. 3	11.36. 7	11.32.11	11.28.15
13	11.57.17	11.53.21	11.49.25	11.45.29	11.41.33	11.37.37
*14	12.27.29	12.23.34	12.19.38	12.15.42	12.11.46	12. 7.50
*15	13. 1. 8	12.57.12	12.53.16	12.49.20	12.45.24	12.41.28
*16	13.18.54	13.14.58	13.11. 2	13. 7. 6	13. 3.10	12.59.14
17	14. 5. 8	14. 1.12	13.57.16	13.53.20	13.49.25	13.45.29
*18	14.11.37	14. 7.41	14. 3.45	13.59.49	13.55.53	13.51.57
19†	14.16.14	14.12.18	14. 8.22	14. 4.26	14. 0.30	13.56.34
*20	15.51.41	15.47.45	15.43.49	15.39.53	15.35.57	15.32. 1
21	16. 0. 6	15.56.10	15.52.14	15.48.18	15.44.23	15.40.27
*22†	16.40. 8	16.36.12	16.32.16	16.28.20	16.24.24	16.20.28
*23	17.33.59	17.30. 3	17.26. 7	17.22.11	17.18.15	17.14.19
24	18.20.54	18.16.58	18.13. 2	18. 9. 6	18. 5.10	18. 1.14
*25	18.57.40	18.53.44	18.49.48	18.45.52	18.41.56	18.38. 1
*26†	19.56.31	19.52.35	19.48.39	19.44.43	19.40.47	19.36.51
27	20.20.51	20.16.55	20.12.59	20. 9. 3	20. 5. 8	20. 1.12
*28	20.32.19	20.28.23	20.24.27	20.20.31	20.16.35	20.12.39
*29	20.47.56	20.44. 1	20.40. 5	20.36. 9	20.32.13	20.28.17
*30	21. 8.24	21. 4.28	21. 0.32	20.56.36	20·52·41	20.48.45
31	21.47.51	21.43.55	21.39.59	21.36. 3	21.32. 7	21.28.11
32	22. 7.16	22. 3.20	21.59.24	21.55.28	21.51.32	21.47.36
33	22.15.44	22.11.48	22. 7.53	22. 3.57	22. 0. 1	21.56. 5
*34†	22.58.53	22.54.57	22.51. 1	22.47. 5	22.43.10	22.39.14
35	23.46.26	23.42.31	23.38.35	23.34.39	23.30.43	23.26.47
36	0.10.29	0. 6.33	0. 2. 37 23. 58. 41	23.54.45	23.50.49	23.46.53
37	0.35.40	0.31.44	0.27.48	0.23.52	0.19.56	0.16. 0
*38	1.14.16	1.10.20	1. 6.24	1. 2.28	0.58.32	0.54.36
*39†	2.25.35	2.21.39	2.17.43	2.13.47	2. 9.51	2. 5.55
40	2.55.36	2.51.40	2.47.44	2.43.48	2.39.52	2.35.56
*41	3.18.23	3.14.27	3.10.31	3. 6.35	3. 2.39	2.58.43
42	4.40.25	4.36.29	4.32.33	4.28.37	4.24.41	4.20.45
*43†	5.30.55	5.26.59	5.23. 3	5.19. 7	5.15.12	5.11.16
44†	5.38.53	5.34.57	5.31. 1	5.27. 5	5.23. 9	5.19.13

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 9	0.48
16	0.12	1. 4
20	0.15	1.20
24	0.18	1.36
28	0.21	1.52
32	0.24	2. 8
36	0.27	2.24
40	0.29	2.40
44	0.32	2.56
48	0.35	3.12
52	0.38	3.28
56	0.41	3.44
60	0.44	4. 0
64	0.47	4.16
68	0.50	4.32
72	0.53	4.48
76	0.56	5. 4
80	0.59	5.20
84	1. 2	5.36
88	1. 5	5.52
92	1. 8	6. 8
96	1.11	6.24
100	1.14	6.40
104	1.17	6.56
108	1.20	7.12
112	1.22	7.28
116	1.25	7.44
120	1.28	8. 0
124	1.31	8.16
128	1.34	8.32
132	1.37	8.48
136	1.40	9. 4
140	1.43	9.20
144	1.46	9.36
148	1.49	9.52
152	1.52	10. 8
156	1.55	10.24
160	1.58	10.40
164	2. 1	10.56
168	2. 4	11.12
172	2. 7	11.28
176	2.10	11.44
180	2.13	12. 0

TABLE B.

APPROXIMATIONS, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal FIXED STARS over the Meridian of Greenwich, with Annual Corrections for Twenty-two years, from 1843 to 1864 inclusive.—For the use of Mariners, Chronometer-makers, Amateur Astronomers, &c.

DECEMBER, 1844.

Day.	16	17	18	19	20	21	22	23	24
Eqn. of Time.	3m. 56s. add.	3m. 26s. add.	2m. 56s. add.	2m. 27s. add.	1m. 57s. add.	1m. 27s. add.	0m. 57s. add.	0m. 27s. add.	0m. 3s. sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	6.18.27	6.14.31	6.10.35	6. 6.40	6. 2.44	5.58.48	5.54.52	5.50.56	5.47. 0
2	6.23.19	6.19.23	6.15.27	6.11.31	6. 7.35	6. 3.39	5.59.43	5.55.48	5.51.52
3	6.53.47	6.49.51	6.45.55	6.41.59	6.38. 3	6.34. 7	6.30.11	6.26.15	6.22.19
4	7.18.57	7.15. 1	7.11. 5	7. 7. 9	7. 3.13	6.59.17	6.55.21	6.51.25	6.47.29
*5	7.49.46	7.45.50	7.41.54	7.37.58	7.34. 2	7.30. 6	7.26.11	7.22.15	7.18.19
6†	8.16.11	8.12.15	8. 8.19	8. 4.24	8, 0.28	7.56.32	7.52.36	7.48.40	7.44.44
7	8.29.13	8,25.17	8.21.21	8.17.25	8.13.30	8. 9.34	8. 5.38	8. 1.42	7.57.46
8	9.11.47	9. 7.51	9. 3.55	8.59.59	8.56. 3	8.52. 7	8.48.11	8.44.15	8.40.19
9	9.30.48	9.26.53	9.22.57	9.19. 1	9.15. 5	9.11. 9	9. 7.13	9. 3.17	8.59.21
*10†	10.44.22	10.40.26	10.36.30	10.32.34	10.28.38	10.24.43	10.20.47	10.16.51	10.12.55
*11	11.22.28	11.18,32	11.14.36	11.10.40	11. 6.44	11. 2.48	10.58.52	10.54.56	10.51. 0
*12	11.24.19	11.20.24	11.16.28	11.12.32	11. 8.36	11. 4.40	11. 0.44	10.56.48	10.52.52
13	11.33.41	11.29.46	11.25.50	11.21.54	11.17.58	11.14. 2	11.10. 6	11. 6.10	11. 2.14
*14	12. 3.54	11.59.58	11.56. 2	11.52. 6	11.48.10	11.44.15	11.40.19	11.36.23	11.32.27
*15	12.37.32	12.33.36	12.29.40	12.25.45	12.21.49	12.17.53	12.13.57	12.10. 1	12. 6. 5
*16	12.55.18	12.51.23	12.47.27	12.43.31	12 39.35	12.35.39	12.31.43	12.27.47	12.23.51
17	13.41.33	13.37.37	13.33.41	13.29.45	13.25.49	13.21.53	13.17.57	13.14. 1	13.10. 6
*18	13.48. 1	13.44. 5	13.40. 9	13.36.14	13.32.18	13.28.22	13.24.26	13.20.30	13.16.34
19†	13.52.38	13.48.42	13.44.47	13.40.51	13.36.55	13.32.59	13.29. 3	13.25. 7	13.21.11
*20	15.28. 5	15.24.10	15.20.14	15.16.18	15.12.22	15. 8.26	15. 4.30	15. 0.34	14.56.38
21	15.36.31	15.32.35	15.28.39	15.24.43	15.20.47	15.16.51	15.12.55	15. 8.59	15. 5. 4
*22†	16.16.33	16.12.37	16. 8.41	16. 4.45	16. 0.49	15.56.53	15.52.57	15.49. 1	15.45. 5
*23	17.10.23	17. 6.27	17. 2.31	16.58.35	16.54.40	16.50.44	16.46.48	16.42.52	16.38.56
24	17.57.18	17.53.22	17.49.26	17.45.31	17.41.35	17.37.39	17.33.43	17.29.47	17.25.51
*25	18.34. 5	18.30. 9	18.26.13	18.22.17	18.18.21	18.14.25	18.10.29	18. 6.33	18. 2.37
*26†	19.32.56	19.29. 0	19.25. 4	19.21. 8	19.17.12	19.13.16	19. 9.20	19. 5.24	19. 1.28
27	19.57.16	19.53.20	19.49.24	19.45.28	19.41,32	19.37.36	19.33.40	19.29.44	19.25.49
*28	20. 8.43	20. 4.47	20. 0.51	19.56.56	19.53. 0	19.49. 4	19 45. 8	19.41.12	19.37.16
*29	20.24.21	20.20.25	20.16.29	20.12.33	20. 8.37	20. 4.42	20. 0.46	19.56.50	19.52.54
*30	20.44.49	20.40.53	20.36.57	20.33. 1	20.29. 5	20.25. 9	20.21.13	20.17.17	20.13.22
31	21.24.15	21.20.20	21.16.24	21.12.28	21. 8.32	21. 4.36	21. 0.40	20.56.44	20.52.48
32	21.43.40	21.39.44	21.35.48	21.31.52	21.27.57	21.24. 1	21.20. 5	21.16. 9	21.12.13
33	21.52. 9	21.48.13	21.44.17	21.40.21	21.36.25	21.32.29	21.28.34	21.24.38	21.20.42
*34†	22.35.18	22.31.22	22.27.26	22.23.30	22.19.34	22.15.38	22.11.42	22. 7.46	22. 3.51
35	23.22.51	23 18.55	23.14.59	23.11, 3	23. 7. 7	23. 3.12	22.59.16	22.55.20	22.51.24
36	23.42.57	23.39. 1	23.35, 5	23.31.10	23.27.14	23.23.18	23.19.22	23.15.26	23.11.30
37	0.12. 4	0. 8. 9	0. 4.13	0. 0. 17 23. 56. 21	23.52.25	23.48.29	23.44.33	23.40.37	23.36.41
*38	0.50.40	0.46.44	0.42.48	0.38.53	0.34.57	0.31, 1	0.27. 5	0.23. 9	0.19.13
*39†	2. 2. 0	1.58. 4	1.54. 8	1.50.12	1.46.16	1.42.20	1.38.24	1.34.28	1.30.32
40	2.32. 1	2.28. 5	2.24. 9	2.20.13	2.16.17	2.12.21	2. 8.25	2. 4.29	2. 0.33
*41	2.54.47	2.50.52	2.46.56	2.43. 0	2.39. 4	2.35. 8	2.31.12	2.27.16	2.23.20
42	4.16.49	4.12.53	4. 8.58	4. 5. 2	4. 1. 6	3.57.10	3.53.14	3.49.18	3.45.22
*43†	5. 7.20	5. 3.24	4.59.28	4.55.32	4.51.36	4.47.40	4.43.44	4.39.48	4.35.53
44†	5 15.17	5.11.21	5. 7.25	5, 3.29	4.59.34	4.55.38	4.51.42	4.47.46	4.43.50

* Signify Stars of the 1st Magnitude.

† Signify Stars fromwhich the Moon's distance is calculated in the Nautical Almanac.

TABLE B.

Approximations, expressed in MEAN TIME of the CULMINATIONS of 44 of the principal Fixed Stars over the Meridian of Greenwich, with Annual Corrections for Twenty-two Years, from 1843 to 1864 inclusive.—For the Use of Mariners, Chronometer Makers, Amateur Astronomers, &c.

DECEMBER, 1844.

Day.	25	26	27	28	29	30	31
Equat. of Time.	0m. 33s	1m. 2s	1m. 32s	2m. 1s	2m. 31s	3m. 0s	3m. 28s
	sub.	sub.	sub.	sub.	sub.	sub.	sub.
No. of Star.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
*1	5.43. 4	5.39. 8	5.35.12	5.31.16	5.27.21	5.23.25	5.19.29
2	5.47.56	5.44. 0	5.40. 4	5.36. 8	5.32.12	5.28.16	5.24.20
3	6.18.24	6.14.28	6.10.32	6. 6.36	6. 2.40	5.58.44	5.54.48
4	6.43.34	6.39.38	6.35.42	6.31.46	6.27.50	6.23.54	6.19.58
*5	7.14.23	7.10.27	7. 6.31	7. 2.35	6.58.39	6.54.43	6.50.47
6†	7.40.48	7.36.52	7.32.56	7.29. 0	7.25. 5	7.21. 9	7.17.13
7	7.53.50	7.49.54	7.45.58	7.42. 2	7.38. 6	7.34.11	7.30.15
8	8.36.23	8.32.28	8.28.32	8.24.36	8.20.40	8.16.44	8.12.48
9	8.55.25	8.51.29	8.47.34	8.43.38	8.39.42	8.35.46	8.31.50
*10†	10. 8.59	10. 5. 3	10. 1. 7	9.57.11	9.53.15	9.49.19	9.45.24
*11	10.47. 5	10.43. 9	10.39.13	10.35.17	10.31.21	10.27.25	10.23.29
*12	10.48.56	10.45. 0	10.41. 5	10.37. 9	10.33.13	10.29.17	10.25.21
13	10.58.18	10.54.22	10.50.27	10.46.31	10.42.35	10.38.39	10.34.43
*14	11.28.31	11.24.35	11.20.39	11.16.43	11.12.47	11. 8.51	11. 4.56
*15	12. 2. 9	11.58.13	11.54.17	11.50.21	11.46.26	11.42.30	11.38.34
*16	12.19.55	12.15.59	12.12. 4	12. 8. 8	12. 4.12	12. 0.16	11.56.20
17	13. 6.10	13. 2.14	12.58.18	12.54.22	12.50.26	12.46.30	12.42.34
*18	13.12.38	13. 8.42	13. 4.46	13. 0.50	12.56.55	12.52.59	12.49. 3
19†	13.17.15	13.13.19	13. 9.23	13. 5.28	13. 1.32	12.57.36	12.53.40
*20	14.52.42	14.48.46	14.44.51	14.40.55	14.36.59	14.33. 3	14.29. 7
21	15. 1. 8	14.57.12	14.53.16	14.49.20	14.45.24	14.41.28	14.37.32
*22†	15.41. 9	15.37.14	15.33.18	15.29.22	15.25.26	15.21.30	15.17.34
*23	16.35. 0	16.31. 4	16.27. 8	16.23.12	16.19.16	16.15.21	16.11.25
24	17.21.55	17.17.59	17.14. 3	17.10. 7	17. 6.12	17. 2.16	16.58.20
*25	17.58.42	17.54.46	17.50.50	17.46.54	17.42.58	17.39. 2	17.35. 6
*26†	18.57.32	18.53.37	18.49.41	18.45.45	18.41.49	18.37.53	18.33.57
27	19.21.53	19.17.57	19.14. 1	19.10. 5	19. 6. 9	19. 2.13	18.58.17
*28	19.33.20	19.29.24	19.25.28	19.21.32	19.17.37	19.13.41	19. 9.45
*29	19.48.58	19.45. 2	19.41. 6	19.37.10	19.33.14	19.29.18	19.25.23
*30	20. 9.26	20. 5.30	20. 1.34	19.57.38	19.53.42	19.49.46	19.45.50
31	20.48.52	20.44.56	20.41. 1	20.37. 5	20.33. 9	20.29.13	20.25.17
32	21. 8.17	21. 4.21	21. 0.25	20.56.29	20.52.33	20.48.38	20.44.42
33	21.16.46	21.12.50	21. 8.54	21. 4.58	21. 1. 2	20.57. 6	20.53.10
*34†	21.59.55	21.55.59	21.52. 3	21.48. 7	21.44.11	21.40.15	21.36.19
35	22.47.28	22.43.32	22.39.36	22.35.40	22.31.44	22.27.48	22.23.53
36	23. 7.34	23. 3.38	22.59.42	22.55.46	22.51.51	22.47.55	22.43.59
37	23.32.45	23.28.50	23.24.54	23.20.58	23.17. 2	23.13. 6	23. 9.10
*38	0.15.17	0.11.21	0. 7.25	0. 3.29 23.59.34	23.55.38	23.51.42	23.47.46
*39†	1.26.36	1.22.41	1.18.45	1.14.49	1.10.53	1. 6.57	1. 3. 1
40	1.56.37	1.52.42	1.48.46	1.44.50	1.40.54	1.36.58	1.33. 2
*41	2.19.24	2.15.28	2.11.33	2. 7.37	2. 3.41	1.59.45	1.55.49
42	3.41.26	3.37.30	3.33.34	3.29.39	3.25.43	3.21.47	3.17.51
*43†	4.31.57	4.28. 1	4.24. 5	4.20. 9	4.16.13	4.12.17	4. 8.21
44†	4.39.54	4.35.58	4.32. 2	4.28. 6	4.24.10	4.20.15	4.16.19
	25	26	27	28	29	30	31

TABLE C.

Longitude.	Sub. W. Add E.	Time.
°	M. S.	H. M.
4	0. 3	0.16
8	0. 6	0.32
12	0. 9	0.48
16	0.12	1. 4
20	0.15	1.20
24	0.18	1.36
28	0.21	1.52
32	0.24	2. 8
36	0.27	2.24
40	0.30	2.40
44	0.33	2.56
48	0.36	3.12
52	0.38	3.28
56	0.41	3.44
60	0.44	4. 0
64	0.47	4.16
68	0.50	4.32
72	0.53	4.48
76	0.56	5. 4
80	0.59	5.20
84	1. 2	5.36
88	1. 5	5.52
92	1. 8	6. 8
96	1.11	6.24
100	1.14	6.40
104	1.17	6.56
108	1.20	7.12
112	1.22	7.28
116	1.25	7.44
120	1.28	8. 0
124	1.32	8.16
128	1.35	8.32
132	1.38	8.48
136	1.41	9. 4
140	1.43	9.20
144	1.46	9.36
148	1.49	9.52
152	1.52	10. 8
156	1.55	10.24
160	1.58	10.40
164	2. 1	10.56
168	2. 4	11.12
172	2. 7	11.28
176	2.10	11.44
180	2.13	12. 0

* Signify Stars of the 1st Magnitude.

† Signify Stars from which the Moon's distance is calculated in the Nautical Almanac.

TABLE D.

APPROXIMATIONS, expressed in MEAN TIME, of the CULMINATIONS of the NORTH POLE STAR, *Polaris*, 1844.

Days.	January.	February.	March.	April.	May.	June.	Days.
	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	
1	6.21.16	4.19.24	2.25.24	0.23.32	22.21.40	20.19.49	1
2	6.17.20	4.15.28	2.21.28	0.19.36	22.17.45	20.15.53	2
3	6.13.24	4.11.32	2.17.32	0.15.40	22.13.49	20.11.57	3
4	6. 9.28	4. 7.36	2.13.36	0.11.44	22. 9.53	20. 8. 1	4
5	6. 5.32	4. 3.40	2. 9.40	0. 7.48	22. 5.57	20. 4. 5	5
6	6. 1.36	3.59.44	2. 5.44	{ 0. 3.52 23.59.56	22. 2. 1	20. 0. 9	6
7	5.57.40	3.55.48	2. 1.48	23.56. 0	21.58. 5	19.56.13	7
8	5.53.44	3.51.53	1.57.53	23.52. 5	21.54. 9	19.52.17	8
9	5.49.49	3.47.57	1.53.57	23.48. 9	21.50.13	19.48.22	9
10	5.45.53	3.44. 1	1.50. 1	23.44.14	21.46.18	19.44.26	10
11	5.41.57	3.40. 5	1.46. 5	23.40.18	21.42.22	19.40.30	11
12	5.38. 1	3.36. 9	1.42.10	23.36.22	21.38.26	19.36.34	12
13	5.34. 5	3.32.13	1.38.14	23.32.26	21.34.30	19.32.38	13
14	5.30. 9	3.28.18	1.34.18	23.28.30	21.30.34	19.28.42	14
15	5.26.13	3.24.22	1.30.22	23.24.34	21.26.38	19.24.46	15
16	5.22.18	3.20.26	1.26.26	23.20.38	21.22.42	19.20.50	16
17	5.18.22	3.16.30	1.22.30	23.16.42	21.18.46	19.16.54	17
18	5.14.26	3.12.34	1.18.34	23.12.47	21.14.50	19.12.59	18
19	5.10.30	3. 8.39	1.14.38	23. 8.51	21.10.54	19. 9. 3	19
20	5. 6.34	3. 4.43	1.10.42	23. 4.55	21. 6.59	19. 5. 7	20
21	5. 2.38	3. 0.47	1. 6.47	23. 0.59	21. 3. 3	19. 1.11	21
22	4.58.43	2.56.51	1. 2.51	22.57. 3	20.59. 7	18.57.15	22
23	4.54.47	2.52.55	0.58.55	22.53. 7	20.55.11	18.53.19	23
24	4.50.51	2.48.59	0.54.59	22.49.11	20.51.16	18.49.24	24
25	4.46.55	2.45. 3	0.51. 3	22.45.15	20.47.20	18.45.28	25
26	4.42.59	2.41. 7	0.47. 7	22.41.20	20.43.24	18.41.32	26
27	4.39. 3	2.37.11	0.43.11	22.37.24	20.39.28	18.37.36	27
28	4.35. 7	2.33.15	0.39.15	22.33.28	20.35.32	18.33.40	28
29	4.31.11	2.29.20	0.35.20	22.29.32	20.31.36	18.29.45	29
30	4.27.16		0.31.24	22.25.36	20.27.40	18.25.49	30
31	4.23.20		0.27.28		20.23.45		31

Days.	July.	August.	September.	October.	November.	December.	Days.
1	18.21.53	16.20. 0	14.18.10	12.20.13	10.18.21	8.20.26	1
2	18.17.57	16.16. 5	14.14.14	12.16.17	10.14.26	8.16.30	2
3	18.14. 1	16.12. 9	14.10.18	12.12.21	10.10.30	8.12.34	3
4	18 10. 5	16. 8.13	14. 6.22	12. 8.26	10. 6.34	8. 8.38	4
5	18. 6. 9	16. 4.17	14. 2.26	12. 4.30	10. 2.38	8. 4.43	5
6	18. 2.13	16. 0.21	13.58.30	12. 0.34	9.58.43	8. 0.48	6
7	17.58.17	15.56.25	13.54.34	11.56.38	9.54.47	7.56.52	7
8	17.54.22	15.52.30	13.50.38	11.52.42	9.50.51	7.52.56	8
9	17.50.26	15.48.34	13.46.42	11.48.46	9.46.55	7.49. 0	9
10	17.46.30	15.44.38	13.42.47	11.44.50	9.42.59	7.45. 4	10
11	17.42.34	15.40.42	13.38.51	11.40.54	9.39. 3	7.41. 8	11
12	17.38.38	15.36.46	13.34.55	11.36.59	9.35. 7	7.37.12	12
13	17.34.43	15.32.50	13.30.59	11.33. 3	9.31.11	7.33.16	13
14	17.30.47	15.28.55	13.27. 3	11.29. 7	9.27.15	7.29.20	14
15	17.26.51	15.24.59	13.23. 7	11.25.11	9.23.19	7.25.25	15
16	17.22.55	15.21. 3	13.19.11	11.21.15	9.19.24	7.21.30	16
17	17.18.59	15.17. 7	13.15.15	11.17.20	9.15.28	7.17.34	17
18	17.15. 3	15.13.11	13.11.20	11.13.24	9.11.32	7.13.38	18
19	17.11. 7	15. 9.15	13. 7.24	11. 9.28	9. 7.36	7. 9.42	19
20	17. 7.11	15. 5.19	13. 3.28	11. 5.32	9. 3.40	7. 5.46	20
21	17. 3.16	15. 1.24	12.59.32	11. 1.36	8.59.44	7. 1.50	21
22	16.59.20	14.57.28	12.55.36	10.57.40	8.55.48	6.57.54	22
23	16.55.24	14.53.32	12.51.40	10.53.44	8.51.53	6.53.59	23
24	16.51.28	14.49.36	12.47.44	10.49.48	8.47.57	6.50. 3	24
25	16.47.32	11.45.40	12.43.48	10.45.53	8.44. 1	6.46. 7	25
26	16.43.36	14.41.44	12.39.52	10.41.57	8.40. 5	6.42.11	26
27	16.39.40	14.37.49	12.35.57	10.38. 1	8.36. 9	6.38.15	27
28	16.35.44	14.33.54	12.32. 1	10.34. 5	8.32.13	6.34.19	28
29	16.31.48	14.29.58	12.28. 5	10.30. 9	8.28.18	6.30.23	29
30	16.27.52	14.26. 2	12.24. 9	10.26.13	8.24.22	6.26.27	30
31	16.23.56	14.22. 6		10.22.17		6.22.31	31

TABLE E.—For Finding the Latitude by the North Pole Star, *Polaris*.

Subtract.

Min.	0 Hours.	1 Hour.	2 Hours.	3 Hours.	4 Hours.	5 Hours.	Min.
	° ′	° ′	° ′	° ′	° ′	° ′	
0	1.31·0	1.27·9	1.18·8	1. 4·3	0.45·5	0.23·6	60
1	1.31·0	1.27·8	1.18·6	1. 4·0	0.45·1	0.23·2	59
2	1.31·0	1.27·7	1.18·4	1. 3·7	0.44·8	0.22·8	58
3	1.31·0	1.27·6	1.18·2	1. 3·4	0.44·4	0.22·4	57
4	1.31·0	1.27·5	1.18·0	1. 3·2	0.44·1	0.22·0	56
5	1.31·0	1.27·4	1.17·8	1. 2·9	0.43·8	0.21·6	55
6	1.31·0	1.27·2	1.17·6	1. 2·6	0.43·4	0.21·2	54
7	1.31·0	1.27·1	1.17·4	1. 2·3	0.43·0	0.20·8	53
8	1.30·9	1.27·0	1.17·2	1. 2·1	0.42·7	0.20·5	52
9	1.30.9	1.26·9	1.17·0	1. 1·8	0.42·4	0.20·1	51
10	1.30·9	1.26·8	1.16·8	1. 1·5	0.42·0	0.19·7	50
11	1.30·9	1.26·6	1.16·5	1. 1·2	0.41·6	0.19·3	49
12	1.30·9	1.26·5	1.16·3	1. 0·9	0.41·3	0.18·9	48
13	1.30·9	1.26·4	1.16·1	1. 0·6	0.40·9	0.18·5	47
14	1.30·8	1.26·3	1.15·8	1. 0·3	0.40·6	0.18·1	46
15	1.30·8	1.26·2	1.15·6	1. 0·0	0.40·2	0.17·7	45
16	1.30·8	1.26·0	1.15·4	0.59·7	0.39·9	0.17·4	44
17	1.30·7	1.25·9	1.15·1	0.59·4	0.39·5	0.17·0	43
18	1.30·7	1.25·8	1.14·9	0.59·1	0.39·2	0.16·6	42
19	1.30·7	1.25·6	1.14·7	0.58·8	0.38·8	0.16·2	41
20	1.30·7	1.25·5	1.14·5	0.58·5	0.38·5	0.15·8	40
21	1.30·6	1.25·4	1.14·3	0.58·2	0.38·1	0.15·4	39
22	1.30·6	1.25·2	1.14·0	0.57·9	0.37·8	0.15·0	38
23	1.30·5	1.25·1	1.13·8	0.57·6	0.37·4	0.14·6	37
24	1.30·5	1.25·0	1.13·6	0.57·3	0.37·0	0.14·2	36
25	1.30·4	1.24·9	1.13·4	0.57·0	0.36·6	0.13·8	35
26	1.30·4	1.24·7	1.13·2	0.56·7	0.36·3	0.13·4	34
27	1.30·3	1.24·6	1.12·9	0.56·3	0.35·9	0.13·0	33
28	1.30·3	1.24·4	1.12·7	0.56·0	0.35·6	0.12·7	32
29	1.30·2	1.24·2	1.12·5	0.55·7	0.35·2	0.12·3	31
30	1.30·2	1.24·1	1.12·2	0.55·4	0.34·8	0.11·9	30
31	1.30·1	1.23·9	1.11·9	0.55·1	0.34·4	0.11·5	29
32	1.30·1	1.23·8	1.11·7	0.54·8	0.34·1	0.11·1	28
33	1.30·0	1.23·6	1.11·4	0.54·4	0.33·7	0.10·7	27
34	1.30·0	1.23·5	1.11·2	0.54·1	0.33·3	0.10·3	26
35	1.29·9	1.23·3	1.10·9	0.53·8	0.32·9	0. 9·9	25
36	1.29·9	1.23·1	1.10·7	0.53·5	0.32·6	0. 9·5	24
37	1.29·8	1.22·9	1.10·5	0.53·1	0.32·2	0. 9·1	23
38	1.29·8	1.22·8	1.10·2	0.52·8	0.31·8	0. 8·7	22
39	1.29·7	1.22·6	1.10·0	0.52·5	0.31·4	0. 8·3	21
40	1.29·6	1.22·5	1. 9·7	0.52·2	0.31·1	0. 7·9	20
41	1.29·5	1.22·3	1. 9·4	0.51·9	0.30·7	0. 7·5	19
42	1.29·4	1.22·1	1. 9·2	0.51·5	0.30·3	0. 7·1	18
43	1.29·4	1.22·0	1. 8·9	0.51·2	0.29·9	0. 6·7	17
44	1.29·3	1.21·8	1. 8·7	0.50·9	0.29·6	0. 6·3	16
45	1.29·2	1.21·6	1. 8·4	0.50·5	0.29·0	0. 5·9	15
46	1.29·2	1.21·5	1. 8·1	0.50·2	0.28·8	0. 5·5	14
47	1.29·1	1.21·3	1. 7·9	0.49·9	0.28·4	0. 5·1	13
48	1.29·0	1.21·1	1. 7·6	0.49·6	0.28·1	0. 4·8	12
49	1.28·9	1.20·9	1. 7·4	0.49·2	0.27·7	0. 4·4	11
50	1.28·8	1.20·7	1. 7·2	0.48·9	0·27·3	0. 4·0	10
51	1.28·8	1.20·5	1. 6·9	0.48·5	0·26·9	0. 3·6	9
52	1.28·7	1.20·3	1. 6·6	0.48·2	0·26·6	0. 3·2	8
53	1.28·6	1.20·1	1. 6·3	0.47·9	0·26·2	0. 2·8	7
54	1.28·5	1.19·9	1. 6·0	0.47·5	0·25·8	0. 2·4	6
55	1.28·4	1.19·7	1. 5·8	0.47·2	0·25·4	0. 2·0	5
56	1.28·3	1.19·6	1. 5·5	0.46·9	0·25·1	0. 1·6	4
57	1.28·2	1.19·4	1. 5·2	0.46·5	0·24·7	0. 1·2	3
58	1.28·1	1.19·2	1. 4·9	0.46·2	0·24·3	0. 0·8	2
59	1.28·0	1.19·0	1. 4·6	0.45·9	0·23·9	0. 0·4	1
60	1.27·9	1.18·8	1. 4·3	0.45·5	0·23·6	0· 0·0	0
	11 Hours.	10 Hours.	9 Hours.	8 Hours.	7 Hours.	6 Hours.	

Add

TABLE F.

ANNUAL CORRECTIONS to be applied to the CULMINATIONS in TABLE B.

FOR JANUARY AND FEBRUARY ONLY.

No. of Star.	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	−1. 0	−2.56	−1.55	−0.55	+0. 5	−2.51	−1.51	−0.51	+0.10	−2.46	−1.46
2	1. 1	2.56	1.55	0.56	0. 5	2.52	1.51	0.51	0. 9	2.47	1.47
3	1. 0	2.55	1.55	0.55	0. 5	2.51	1.50	0.50	0.10	2.46	1.46
4	1. 0	2.55	1.55	0.54	0. 6	2.50	1.49	0.49	0.12	2.44	1.44
5	1. 0	2.57	1.57	0.58	0. 1	2.56	1.58	0.57	0. 3	2.54	1.56
6	1. 0	2.55	1.54	0.55	0. 5	2.50	1.49	0.49	0.11	2.44	1.43
7	1. 0	2.56	1.55	0.56	0. 5	2.51	1.51	0.51	0.10	2.47	1.46
8	1. 0	2.55	1.55	0.55	0. 5	2.51	1.50	0.50	0.10	2.46	1.45
9	1. 1	2.54	1.53	0.52	0.10	2.45	1.44	0.42	0.19	2.36	1.34
10	1. 1	2.55	1.55	0.55	0. 6	2.50	1.49	0.48	0.12	2.43	1.43
11	−1. 2	−2.55	−1.53	−0.52	+0.10	−2.45	−1.43	−0.42	+0.20	−2.35	−1.33
12	1. 0	2.55	1.55	0.56	0. 4	2.52	1.52	0.52	0. 9	2.48	1.48
13	1. 1	2.55	1.53	0.53	0. 8	2.47	1.47	0.45	0.16	2.40	1.39
14	1. 0	2.56	1.55	0.56	+0. 3	2.53	1.52	0.52	+0. 7	2.49	1.49
15	0.58	2.57	1.58	1. 1	−0. 2	2.56	1.57	0.58	−0. 5	2.53	1.55
16	0.59	2.56	1.56	0.57	+0. 4	2.53	1.53	0.53	+0. 7	2.50	1.50
17	1. 1	2.55	1.54	0.54	0. 8	2.48	1.47	0.46	0.16	2.40	1.39
18	1. 0	2.55	1.55	0.55	0. 5	2.51	1.50	0.50	0.10	2.46	1.45
19	1. 1	2.55	1.54	0.54	+0. 7	2.48	1.47	0.46	+0.15	2.41	1.40
20	0.58	2.58	2. 0	1. 3	−0. 4	2.54	1.55	0.58	−0. 9	2.49	1.51
21	−1. 0	−2.56	−1.56	−0.56	+0. 4	−2.52	−1.52	−0.52	+0. 8	−2.48	−1.48
22	1. 0	2.55	1.55	0.55	0. 6	2.48	1.50	0.49	0.11	2.43	1.45
23	1. 1	2.55	1.54	0.53	0. 8	2.48	1.47	0.46	0.16	2.40	1.39
24	1. 0	2.56	1.55	0.55	0. 5	2.51	1.51	0.51	0.10	2.46	1.46
25	1. 1	2.56	1.55	0.56	0. 5	2.51	1.50	0.50	0.10	2.45	1.45
26	1. 0	2.55	1.55	0.55	0. 6	2.50	1.50	0.50	0.11	2.45	1.45
27	1. 0	2.57	1.57	0.58	0. 2	2.55	1.55	0.56	0. 4	2.53	1.53
28	1. 1	2.54	1.53	0.52	0.10	2.46	1.45	0.43	0.19	2.37	1.35
29	1. 0	2.56	1.56	0.57	0. 3	2.53	1.53	0.53	0. 7	2.50	1.50
30	1. 2	2.55	1.54	0.53	0. 8	2.47	1.46	0.45	0.17	2.38	1.37
31	−1. 0	−2.55	−1.55	−0.55	+0. 6	−2.51	−1.50	−0.50	+0.11	−2.45	−1.45
32	1. 0	2.56	1.56	0.57	0. 3	2.54	1.54	0.55	0. 5	2.51	1.52
33	1. 0	2.56	1.56	0.56	0. 4	2.52	1.52	0.52	0. 8	2.48	1.48
34	1. 1	2.55	1.54	0.54	0. 7	2.49	1.47	0.46	0.14	2.41	1.40
35	1. 0	2.56	1.56	0.57	0. 3	2.53	1.53	0.53	0. 7	2.50	1.50
36	1. 0	2.56	1.56	0.56	+0. 4	2.53	1.53	0.53	+0. 7	2.49	1.49
37	0.58	2.57	1.58	0.59	−0. 1	2.56	1.57	0.57	−0. 3	2.54	1.55
38	0.59	2.56	1.57	0.58	+0. 1	2.56	1.57	0.58	+0. 1	2.56	1.57
39	1. 0	2.55	1.55	0.56	0. 5	2.52	1.51	0.51	0. 9	2.47	1.47
40	1. 2	2.53	1.51	0.50	0.12	2.42	1.40	0.38	0.24	2.31	1.28
41	−0.59	−2.56	−1.57	−0.58	+0. 1	−2.56	−1.57	−0.58	+0. 2	−2.55	−1.56
42	1. 1	2.55	1.54	0.53	0. 8	2.47	1.46	0.45	0.16	2.39	1.38
43	1. 1	2.56	1.55	0.55	0. 5	2.50	1.50	0.49	0.11	2.45	1.44
44	1. 0	2.56	1.55	0.56	0. 4	2.52	1.52	0.52	0. 9	2.47	1.47
	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854

ANNUAL CORRECTIONS for the NORTH POLE STAR CULMINATIONS in TABLE D.

FOR JANUARY AND FEBRUARY ONLY.

	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
0	−1.14	−2.44	−1.30	−0.16	+0.56	−1.48	−0.34	+0.40	+1.52	−0.52	+0.22

TABLE F.

ANNUAL CORRECTIONS to be applied to the CULMINATIONS in TABLE B.

FOR JANUARY AND FEBRUARY ONLY.

No. of Star.	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	−0.46	+0.15	−2.42	−1.41	−0.41	+0.19	−2.37	−1.37	−0.36	+0.24
2	0.46	0.14	2.42	1.42	0.41	0.19	2.37	1.37	0.37	0.24
3	0.45	0.15	2.41	1.41	0.41	0.20	2.36	1.36	0.36	0.25
4	0.43	0.18	2.38	1.38	0.37	0.23	2.33	1.32	0.32	0.29
5	0.55	0. 5	2.52	1.55	0.54	0. 6	2.51	1.53	0.52	0. 8
6	0.43	0.17	2.38	1.37	0.37	0.23	2.32	1.31	0.31	0.29
7	0.46	0.14	2.42	1.42	0.41	0.19	2.37	1.37	0.37	0.24
8	0.45	0.16	2.41	1.40	0.40	0.21	2.36	1.35	0.35	0.26
9	0.33	0.29	2.26	1.25	0.23	0.38	2.17	1.15	0.14	0.48
10	0.42	0.19	2.37	1.36	0.36	0.25	2.31	1.30	0.30	0.31
11	−0.31	+0.30	−2.24	−1.23	−0.21	+0.41	−2.14	−1.13	−0.11	+0.51
12	0.48	0.13	2.44	1.44	0.44	0.17	2.40	1.40	0.39	0.21
13	0.37	0.23	2.32	1.31	0.29	0.31	2.24	1.23	0.22	0.39
14	0.48	+0.11	2.45	1.45	0.45	+0.14	2.42	1.42	0.41	+0.18
15	0.56	−0. 7	2.51	1.53	0.54	−0. 9	2.49	1.50	0.52	−0.11
16	0.50	+0.10	2.47	1.47	0.47	+0.13	2.43	1.44	0.44	+0.16
17	0.38	0.23	2.32	1.30	0.30	0.31	2.24	1.23	0.22	0.39
18	0.45	0.15	2.41	1.40	0.40	0.20	2.36	1.35	0.35	0.26
19	0.39	+0.22	2.34	1.33	0.32	+0.29	2.26	1.26	0.25	+0.37
20	0.54	−0.13	2.45	1.46	0.49	−0.18	2.40	1.42	0.45	−0.22
21	−0.48	+0.13	−2.44	−1.43	−0.43	+0.17	−2.39	−1.39	−0.39	+0.21
22	0.44	0.17	2.38	1.39	0.39	0.22	2.32	1.34	0.33	0.27
23	0.38	0.23	2.32	1.31	0.30	0.31	2.24	1.24	0.22	0.39
24	0.46	0.14	2.42	1.42	0.41	0.19	2.37	1.37	0.36	0.24
24	0.45	0.16	2.40	1.40	0.40	0.21	2.35	1.34	0.34	0.26
26	0.45	0.16	2.40	1.40	0.40	0.21	2.35	1.35	0.34	0.26
27	0.54	0. 6	2.51	1.51	0.52	0. 8	2.49	1.49	0.50	0.10
28	0.34	0.28	2.28	1.26	0.25	0.37	2.19	1.17	0.16	0.47
29	0.50	0.10	2.46	1.46	0.46	0.14	2.43	1.43	0.43	0.17
30	0.36	0.25	2.30	1.29	0.27	0.34	2.21	1.20	0.19	0.43
31	−0.45	+0.16	−2.40	−1.40	−0.40	+0.21	−2.35	−1.35	−0.34	+0.26
32	0.52	0. 8	2.49	1.49	0.49	0.11	2.46	1.46	0.47	0.13
33	0.47	0.13	2.44	1.43	0.43	0.17	2.39	1.39	0.39	0.21
34	0.39	0.22	2.34	1.33	0.32	0.29	2.26	1.25	0.24	0.37
35	0.50	0.10	2.46	1.46	0.46	0.14	2.43	1.44	0.43	0.17
36	0.49	+0.11	2.45	1.45	0.45	+0.15	2.42	1.42	0.42	+0.18
37	0.55	−0. 5	2.52	1.53	0.54	−0. 7	2.50	1.51	0.52	−0. 9
38	0.57	+0. 2	2.55	1.56	0.56	+0. 3	2.54	1.55	0.56	+0. 3
39	0.47	0.13	2.43	1.43	0.43	0.17	2.39	1.39	0.39	0.22
40	0.26	0.36	2.19	1.16	0.14	0.48	2. 7	1. 4	0. 2	1. 0
41	−0.57	+0. 3	−2.55	−1.56	−0.56	+0. 3	−2.54	−1.55	−0.55	+0. 4
42	0.37	0.24	2.31	1.30	0.29	0.32	2.24	1.23	0.21	0.40
43	0.43	0.17	2.39	1.38	0.37	0.23	2.33	1.32	0.32	0.29
44	0.47	0.13	2.43	1.43	0.43	0.18	2.38	1.38	0.38	0.22
	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864

ANNUAL CORRECTIONS for the NORTH POLE STAR CULMINATIONS in TABLE D.

FOR JANUARY AND FEBRUARY ONLY.

	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
0	+1.36	+2.48	+0. 4	+1.18	+2.32	+3.44	+1. 0	+2.14	+3.28	+4.40

TABLE F.

ANNUAL CORRECTIONS to be applied to the CULMINATIONS in TABLE B.

FROM MARCH 1 TO DECEMBER 31, BOTH INCLUSIVE.

No. of Star.	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	+2.56	+1. 0	+2. 1	+3. 1	+0. 5	+1. 5	+2. 5	+3. 6	+0.10	+1.10	+2.10
2	2.55	1. 0	2. 0	3. 1	0. 3	1. 5	2. 5	3. 5	0. 8	1.10	2.10
3	2.55	1. 0	2. 0	3. 0	0. 4	1. 5	2. 5	3. 5	0. 9	1. 9	2.10
4	2.55	1. 0	2. 1	3. 1	0. 5	1. 6	2. 6	3. 7	0.11	1.11	2.12
5	2.56	0.59	1.59	2.58	0. 1	1. 1	2. 0	3. 0	0. 3	1. 2	2. 2
6	2.55	1. 1	2. 1	3. 2	0. 6	1. 7	2. 7	3. 8	0.12	1.13	2.13
7	2.56	1. 0	2. 1	3. 1	0. 5	1. 5	2. 5	3. 6	0.10	1.10	2.10
8	2.56	1. 1	2. 1	3. 1	0. 5	1. 6	2. 6	3. 7	0.10	1.11	2.11
9	2.55	1. 2	2. 4	3. 5	0.10	1.11	2.13	3.14	0.19	1.21	2.22
10	2.55	1. 1	2. 1	3. 2	0. 6	1. 7	2. 7	3. 8	0.12	1.13	2.14
11	+2.54	+1. 1	+2. 3	+3. 5	+0.10	+1.12	+2.14	+3.15	+0.20	+1.22	+2.24
12	2.56	1. 0	2. 1	3. 1	0. 4	1. 5	2. 5	3. 5	0. 8	1. 9	2. 9
13	2.55	1. 2	2. 3	3. 3	0. 8	1.10	2.10	3.11	0.16	1.18	2.10
14	2.55	1. 0	2. 1	3. 1	+0. 3	1. 4	2. 4	3. 5	+0. 7	1. 8	2. 8
15	2.57	0.58	1.57	2.56	−0. 2	1. 1	1.59	2.58	−0. 4	1. 3	2. 1
16	2.56	1. 0	2. 0	3. 0	+0. 3	1. 3	2. 3	3. 3	+0. 7	1. 6	2. 6
17	2.55	1. 1	2. 2	3. 3	0. 8	1. 9	2.10	3.11	0.16	1.17	2.18
18	2.56	1. 0	2. 1	3. 1	0. 5	1. 6	2. 6	3. 6	0.10	1.11	2.11
19	2.55	1. 1	2. 2	3. 3	+0. 7	1. 8	2. 9	3.10	+0.15	1.16	2.17
20	2.58	0.58	1.56	2.54	−0. 5	1. 2	2. 0	2.58	−0. 9	1. 7	2. 5
21	+2.55	+1. 0	+2. 0	+3. 0	+0. 4	+1. 4	+2. 4	+3. 4	+0. 8	+1. 8	+2. 9
22	2.55	1. 1	2. 1	3. 2	0. 6	1. 6	2. 7	3. 7	0.11	1.12	2.12
23	2.55	1. 1	2. 2	3. 3	0. 8	1.14	2.10	3.11	0.16	1.22	2.18
24	2.56	1. 0	2. 1	3. 1	0. 5	1. 5	2. 5	3. 6	0.10	1.10	2.10
25	2.55	1. 0	2. 1	3. 1	0. 5	1. 5	2. 6	3. 6	0.10	1.11	2.11
26	2.56	1. 1	2. 1	3. 2	0. 6	1. 6	2. 6	3. 7	0.11	1.11	2.12
27	2.56	0.59	1.59	2.58	0. 1	1. 1	2. 1	3. 0	0. 3	1. 3	2. 3
28	2.55	1. 2	2. 3	3. 4	0. 9	1.11	2.12	3.14	0.18	1.20	2.21
29	2.56	1. 0	2. 0	3. 0	0. 3	1. 3	2. 3	3. 3	0. 7	1. 7	2. 7
30	2.54	1. 1	2. 2	3. 3	0. 8	1.10	2.11	3.12	0.17	1.18	2.20
31	+2.56	+1. 1	+2. 1	+3. 2	+0. 5	+1. 6	+2. 6	+3. 7	+0.11	+1.11	+2.11
32	2.56	1. 0	2. 0	2.59	0. 3	1. 2	2. 2	3. 2	0. 5	1. 5	2. 5
33	2.56	1. 0	2. 0	3. 0	0. 4	1. 4	2. 5	3. 5	0. 8	1. 9	2. 9
34	2.55	1. 1	2. 2	3. 3	0. 7	1. 8	2. 9	3.10	0.14	1.15	2.16
35	2.56	1. 0	2. 0	3. 0	0. 3	1. 3	2. 3	3. 3	0. 7	1. 7	2. 6
36	2.56	1. 0	2. 0	2.59	+0. 2	1. 2	2. 4	3. 2	+0. 6	1. 6	2. 7
37	2.57	1. 0	1.57	2.56	−0. 2	1. 1	1.59	2.58	−0. 4	1. 3	2. 1
38	2.57	0.59	1.59	2.58	+0. 1	1. 0	1.59	2.58	+0. 1	1. 1	2. 0
39	2.55	1. 0	2. 0	3. 0	0. 4	1. 4	2. 4	3. 4	0. 8	1. 8	2. 8
40	2.54	1. 2	2. 4	3. 6	0.12	1.14	2.16	3.18	0.24	1.26	2.28
41	+2.57	+1. 0	+1.59	+2.58	+0. 1	+1. 0	+2. 0	+2.59	+0. 2	+1. 1	+2. 0
42	2.55	1. 1	2. 3	3. 4	0. 8	1. 9	2.10	3.12	0.16	1.17	2.18
43	2.55	1. 0	2. 1	3. 2	0. 5	1. 6	2. 7	3. 7	0.11	1.12	2.13
44	2.56	1. 0	2. 0	3. 1	0. 4	1. 5	2. 5	3. 5	0. 9	1. 9	2. 9
	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854

ANNUAL CORRECTIONS for the NORTH POLE STAR CULMINATIONS in TABLE D.

FROM MARCH 1 TO DECEMBER 31, BOTH INCLUSIVE.

	1843	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
0	+2.42	+1.12	+2.27	+3.40	+0.56	+2. 8	+3.23	+4.36	+1.52	+3. 4	+4.19

TABLE F.

ANNUAL CORRECTIONS to be applied to the CULMINATIONS in TABLE B.

FROM MARCH 1 TO DECEMBER 31, BOTH INCLUSIVE.

No. of Star.	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	+3. 11	+0. 14	+1. 15	+2. 15	+3. 15	+0. 19	+1. 20	+2. 20	+3. 20	+0. 24
2	3. 10	0. 13	1. 14	2. 15	3. 15	0. 18	1. 19	2. 20	3. 20	0. 23
3	3. 10	0. 14	1. 14	2. 15	3. 15	0. 19	1. 19	2. 20	3. 20	0. 24
4	3. 13	0. 17	1. 17	2. 18	3. 18	0. 22	1. 23	2. 23	3. 24	0. 28
5	3. 1	0. 4	1. 4	2. 4	3. 3	0. 6	1. 6	2. 5	3. 5	0. 8
6	3. 14	0. 18	1. 19	2. 19	3. 20	0. 24	1. 25	2. 25	3. 26	0. 30
7	3. 10	0. 14	1. 15	2. 15	3. 15	0. 19	1. 19	2. 20	3. 20	0. 24
8	3. 12	0. 15	1. 16	2. 16	3. 17	0. 21	1. 21	2. 21	3. 22	0. 26
9	3. 24	0. 29	1. 30	2. 32	3. 33	0. 39	1. 40	2. 41	3. 43	0. 48
10	3. 15	0. 19	1. 19	2. 20	3. 21	0. 25	1. 26	2. 26	3. 27	0. 31
11	+3. 26	+0. 31	+1. 32	+2. 34	+3. 36	+0. 41	+1. 43	+2. 44	+3. 46	+0. 51
12	3. 9	0. 13	1. 13	2. 13	3. 13	0. 17	1. 17	2. 17	3. 17	0. 21
13	3. 19	0. 23	1. 26	2. 26	3. 27	0. 31	1. 33	2. 33	3. 34	0. 39
14	3. 8	+0. 10	1. 11	2. 11	3. 12	+0. 14	1. 15	2. 15	3. 16	+0. 18
15	3. 0	−0. 7	1. 5	2. 3	3. 2	−0. 9	1. 7	2. 6	3. 4	−0. 11
16	3. 6	+0. 10	1. 10	2. 10	3. 10	+0. 13	1. 13	2. 13	3. 13	+0. 16
17	3. 19	0. 24	1. 25	2. 26	3. 27	0. 31	1. 33	2. 34	3. 35	0. 39
18	3. 11	0. 15	1. 16	2. 16	3. 16	0. 20	1. 21	2. 21	3. 22	0. 25
19	3. 17	+0. 22	1. 23	2. 24	3. 24	+0. 29	1. 30	2. 31	3. 32	+0. 37
20	3. 3	−0. 14	1. 11	2. 9	3. 7	−0. 18	1. 16	2. 14	3. 12	−0. 23
21	+3. 9	+0. 13	+1. 13	+2. 13	+3. 13	+0. 17	+1. 17	+2. 17	+3. 17	+0. 21
22	3. 12	0. 16	1. 17	2. 17	3. 18	0. 22	1. 22	2. 23	3. 23	0. 27
23	3. 19	0. 23	1. 29	2. 25	3. 26	0. 31	1. 37	2. 33	3. 34	0. 39
24	3. 10	0. 14	1. 15	2. 15	3. 15	0. 19	1. 19	2. 20	3. 20	0. 24
25	3. 12	0. 16	1. 16	2. 16	3. 17	0. 21	1. 22	2. 22	3. 22	0. 26
26	3. 12	0. 16	1. 16	2. 17	3. 17	0. 21	1. 21	2. 22	3. 22	0. 26
27	3. 2	0. 5	1. 5	2. 5	3. 4	0. 7	1. 7	2. 7	3. 6	0. 9
28	3. 23	0. 28	1. 29	2. 30	3. 32	0. 37	1. 38	2. 39	3. 41	0. 46
29	3. 7	0. 10	1. 10	2. 10	3. 10	0. 14	1. 14	2. 14	3. 14	0. 17
30	3. 20	0. 26	1. 27	2. 28	3. 29	0. 34	1. 35	2. 37	3. 37	0. 43
31	+3. 12	+0. 16	+1. 16	+2. 17	+3. 17	+0. 21	+1. 22	+2. 22	+3. 22	+0. 26
32	3. 5	0. 8	1. 8	2. 7	3. 7	0. 11	1. 10	2. 10	3. 10	0. 13
33	3. 9	0. 13	1. 13	2. 13	3. 13	0. 17	1. 17	2. 18	3. 18	0. 21
34	3. 17	0. 22	1. 23	2. 24	3. 25	0. 29	1. 30	2. 31	3. 32	0. 37
35	3. 7	0. 10	1. 10	2. 10	3. 10	0. 14	1. 14	2. 13	3. 13	0. 17
36	3. 6	+0. 10	1. 10	2. 11	3. 10	+0. 13	1. 13	2. 15	3. 13	+0. 17
37	3. 0	−0. 6	1. 5	2. 3	3. 2	−0. 8	1. 6	2. 5	3. 4	−0. 9
38	2. 59	+0. 2	1. 1	2. 0	3. 0	+0. 3	1. 2	2. 1	3. 0	+0. 3
39	3. 8	0. 12	1. 12	2. 12	3. 13	0. 16	1. 17	2. 17	3. 17	0. 21
40	3. 30	0. 35	1. 38	2. 40	3. 42	0. 47	1. 49	2. 52	3. 54	0. 59
41	+3. 0	+0. 2	+1. 2	+2. 1	+3. 0	+0. 3	+1. 2	+2. 2	+3. 1	+0. 4
42	3. 19	0. 24	1. 25	2. 26	3. 27	0. 32	1. 33	2. 34	3. 35	0. 40
43	3. 13	0. 17	1. 18	2. 18	3. 19	0. 23	1. 24	2. 24	3. 25	0. 29
44	3. 10	0. 13	1. 14	2. 14	3. 14	0. 18	1. 18	2. 18	3. 19	0. 22
	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864

ANNUAL CORRECTIONS for the NORTH POLE STAR CULMINATIONS in TABLE D.

FROM MARCH 1 TO DECEMBER 31, BOTH INCLUSIVE.

	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
0	+5. 32	+2. 48	+4. 0	+5. 15	+6. 28	+3. 44	+4. 56	+6. 11	+7. 24	+4. 40

TABLE G.

ACCELERATIONS of the FIXED STARS, corresponding to the Number of Revolutions of the Earth, opposite to which they stand.

Rv.	Accel^ns	Rv.	Accel^ns	Rv.	Accel^ns	Rev.	Accel^ns	Rev.	Accel^ns	Rev.	Accel^ns
	H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.
1	0. 3.55·9	36	2.21.32·4	71	4.39. 8·9	106	6.56.45·4	141	9.14.21·9	176	11.31.58·4
2	0. 7.51·8	37	2.25.28·3	72	4.43. 4·8	107	7. 0.41·3	142	9.18.17·8	177	11.35.54·3
3	0.11.47.7	38	2.29.24·2	73	4.47. 0·7	108	7. 4.37·2	143	9.22.13·7	178	11.39.50·2
4	0.15.43·6	39	2.33.20·1	74	4.50.56·6	109	7. 8.33·1	144	9.26. 9·6	179	11.43.46·1
5	0.19.39·5	40	2.37.16·0	75	4.54.52.5	110	7.12.29·0	145	9.30. 5·5	180	11.47.42·0
6	0.23.35·4	41	2.41.11·9	76	4.58.48·4	111	7.16.24·9	146	9.34. 1·4	181	11.51.37·9
7	0.27.31·3	42	2.45. 7·8	77	5. 2.44·3	112	7.20.20·8	147	9.37.57·3	182	11.55.33·8
8	0.31.27·2	43	2.49. 3·7	78	5. 6.40·2	113	7.24.16·7	148	9.41.53·2	183	11.59.29·7
9	0.35.23·1	44	2.52.59·6	79	5.10.36·1	114	7.28.12·6	149	9.45.49·1	184	12. 3.25·6
10	0.39.19·0	45	2.56.55·5	80	5.14.32·0	115	7.32. 8·5	150	9.49.45·0	185	12. 7.21·5
11	0.43.14·9	46	3. 0.51·4	81	5.18.27·9	116	7.36. 4·4	151	9.53.40·9	186	12.11.17·4
12	0.47.10·8	47	3. 4.47·3	82	5.22.23·8	117	7.40. 0·3	152	9.57.36·8	187	12.15.13·3
13	0.51. 6·7	48	3. 8.43·2	83	5.26.19·7	118	7.43.56·2	153	10. 1.32·7	188	12.19. 9·2
14	0.55. 2·6	49	3.12.39·1	84	5.30.15·6	119	7.47.52·1	154	10. 5.28·6	189	12.23. 5·1
15	0.58.58·5	50	3.16.35·0	85	5.34.11·5	120	7.51.48·0	155	10. 9.24·5	190	12.27. 1·0
16	1. 2.54·4	51	3.20.30·9	86	5.38. 7·4	121	7.55.43·9	156	10.13.20·4	191	12.30.56·9
17	1. 6.50·3	52	3.24.26·8	87	5.42. 3·3	122	7.59.39·8	157	10.17.16·3	192	12.34.52·8
18	1. 10.46·2	53	3.28.22·7	88	5.45.59·2	123	8. 3.35·7	158	10.21.12·2	193	12.38.48·7
19	1.14.42·1	54	3.32.18·6	89	5.49.55·1	124	8. 7.31·6	159	10.25. 8·1	194	12.42.44·6
20	1.18.38·0	55	3.36.14·5	90	5.53.51·0	125	8.11.27·5	160	10.29. 4·0	195	12.46.40·5
21	1.22.33·9	56	3.40.10·4	91	5.57.46·9	126	8.15.23·4	161	10.32.59·9	196	12.50.36·4
22	1.26.29·8	57	3.44. 6·3	92	6. 1.42·8	127	8.19.19·3	162	10.36.55·8	197	12.54.32·3
23	1.30.25·7	58	3.48. 2·2	93	6. 5.38·7	128	8.23.15·2	163	10.40.51·7	198	12.58.28·2
24	1.34.21·6	59	3.51.58·1	94	6. 9.34·6	129	8.27.11·1	164	10.44.47·6	199	13. 2.24·1
25	1.38.17·5	60	3.55.54·0	95	6.13.30·5	130	8.31. 7.0	165	10.48.43·5	200	13. 6.20·0
26	1.42.13·4	61	3.59.49·9	96	6.17.26·4	131	8.35. 2·9	166	10.52.39·4	201	13.10.15·9
27	1.46. 9·3	62	4. 3.45·8	97	6.21.22·3	132	8.38.58·8	167	10.56.35·3	202	13.14.11·8
28	1.50. 5·2	63	4. 7.41·7	98	6.25.18·2	133	8.42.54·7	168	11. 0.31·2	203	13.18. 7·7
29	1.54. 1·1	64	4.11.37·6	99	6.29.14·1	134	8.46.50·6	169	11. 4.27·1	204	13.22. 3·6
30	1.57.57·0	65	4.15.33·5	100	6.33.10·0	135	8.50.46·5	170	11. 8.23·0	205	13.25.59·5
31	2. 1.52·9	66	4.19.29·4	101	6.37. 5·9	136	8.54.42·4	171	11.12.18·9	206	13.29.55·4
32	2. 5.48·8	67	4.23.25·3	102	6.41. 1·8	137	8.58.38·3	172	11.16.14·8	207	13.33.51·3
33	2. 9.44·7	68	4.27.21·2	103	6.44.57·7	138	9. 2.34·2	173	11.20.10·7	208	13.37.47·2
34	2.13.40·6	69	4.31.17·1	104	6.48.53·6	139	9. 6.30·1	174	11.24. 6·6	209	13.41.43·1
35	2.17.36·5	70	4.35.13·0	105	6.52.49·5	140	9.10.26·0	175	11.28. 2·5	210	13.45.39·0

REMARK.

This Table will be found very convenient to determine the Rate of Chronometers, Clocks, &c., either by the passage of Fixed Stars over the Meridian, and even from three to four points of the Compass on either side of the Meridian, provided they be not less than five degrees above the horizon. By observing the Eclipse or Immersion, *from the same place*, of any fixed Star behind a Tower, Steeple, Chimney, or any other fixed object.* Whatever difference the Clock, &c., may indicate from the quantities in this Table is its Error between the Observations, whether the interval be one day or one year.—For further Instructions see Example, p. 61, and Explanation of this Table.

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* The Emersion, or coming out from behind the interposing object, may also be used; but it will not be found so convenient.

TABLE G.

ACCELERATIONS of the FIXED STARS, corresponding to the Number of Revolutions of the Earth, opposite to which they stand.

Rev.	Accel^{ns}	Rev.	Accel^{ns}	Rev.	Accel^{ns}	Rev.	Accel^{ns}	Rev.	Accel^{ns}
	H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.
211	13.49.34·9	246	16. 7.11·4	281	18.24.47·9	316	20.42.24·4	351	23. 0. 0·9
212	13.53.30·8	247	16.11. 7·3	282	18.28.43·8	317	20.46.20·3	352	23. 3.56·8
213	13.57.26·7	248	16.15. 3·2	283	18.32.39·7	318	20.50.16·2	353	23. 7.52·7
214	14. 1.22·6	249	16.18.59·1	284	18.36.35·6	319	20.54.12·1	354	23.11.48·6
215	14. 5.18·5	250	16.22.55·0	285	18.40.31·5	320	20.58. 8·0	355	23.15.44·5
216	14. 9.14·4	251	16.26.50·9	286	18.44.27·4	321	21. 2. 3·9	356	23.19.40·4
217	14.13.10·3	252	16.30.46·8	287	18.48.23·3	322	21. 5.59·8	357	23.23.36·3
218	14.17. 6·2	253	16.34.42·7	288	18.52.19·2	323	21. 9.55·7	358	23.27.32·2
219	14.21. 2·1	254	16.38.38·6	289	18.56.15·1	324	21.13.51·6	359	23.31.28·1
220	14.24.58·0	255	16.42.34·5	290	19. 0.11·0	325	21.17.47·5	360	23.35.24·0
221	14.28.53·9	256	16.46.30·4	291	19. 4. 6·9	326	21.21.43·4	361	23.39.19·9
222	14.32.49·8	257	16.50.26·3	292	19. 8. 2·8	327	21.25.39·3	362	23.43.15·8
223	14.36.45·7	258	16.54.22·2	293	19.11.58·7	328	21.29.35·2	363	23.47.11·7
224	14.40.41·6	259	16.58.18·1	294	19.15.54·6	329	21.33.31·1	364	23.51. 7·6
225	14.44.37·5	260	17. 2.14·0	295	19.19.50·5	330	21.37.27·0	365	23.55. 3·5
226	14.48.33·4	261	17. 6. 9·9	296	19.23.46·4	331	21.41.22·9	366	23.58.59·4
227	14.52.29·3	262	17.10. 5·8	297	19.27.42·3	332	21.45.18·8	367	24. 2.55·3
228	14.56.25·2	263	17.14. 1·7	298	19.31.38·2	333	21.49.14·7	368	24. 6.51·2
229	15. 0.21·1	264	17.17.57·6	299	19.35.34·1	334	21.53.10·6	369	24.10.47·1
230	15. 4.17·0	265	17.21.53·5	300	19.39.30·0	335	21.57. 6·5	370	24.14.43·0
231	15. 8.12·9	266	17.25.49·4	301	19.43.25·9	336	22. 1. 2·4	371	24.18.38·9
232	15.12. 8·8	267	17.29.45·3	302	19.47.21·8	337	22. 4.58·3	372	24.22.34·8
233	15.16. 4·7	268	17.33.41·2	303	19.51.17·7	338	22. 8.54·2	373	24.26.30·7
234	15.20. 0·6	269	17.37.37·1	304	19.55.13 6	339	22.12.50·1	374	24.30.26·6
235	15.23.56·5	270	17.41.33·0	305	19.59. 9·5	340	22.16.46·0	375	24.34.22·5
236	15.27.52·4	271	17.45.28·9	306	20. 3. 5·4	341	22.20.41·9	376	24.38.18·4
237	15.31.48·3	272	17.49.24·8	307	20. 7. 1·3	342	22.24.37·8	377	24.42.14·3
238	15.35.44·2	273	17.53.20·7	308	20.10.57·2	343	22.28.33·7	378	24.46.10·2
239	15.39.40·1	274	17.57.16·6	309	20.14.53·1	344	22.32.29·6	379	24.50. 6·1
240	15.43.36·0	275	18. 1.12·5	310	20.18.49·0	345	22.36.25·5	380	24.54. 2·0
241	15.47.31·9	276	18. 5. 8·4	311	20.22.44·9	346	22.40.21·4	381	24.57.57·9
242	15.51.27·8	277	18. 9. 4·3	312	20.26.40·8	347	22.44.17·3	382	25. 1.53·8
243	15.55.23·7	278	18.13. 0·2	313	20.30.36·7	348	22.48.13·2	383	25. 5.49·7
244	15.59.19·6	279	18.16.56·1	314	20.34.32·6	349	22.52. 9·1	384	25. 9.45·6
245	16. 3.15·5	280	18.20.52·0	315	20.38.28·5	350	22.56. 5·0	385	25.13.41·5

A simple Method of regulating domestic Clocks, &c.

EXAMPLE.—Suppose, on the 30th January, 1844, I observed (from my window, fronting southward) the star *Sirius*, No. 16, pass behind a tower, chimney, &c., on the opposite side of the street, when the clock (which had been recently set) showed $9^h. 11^m. 4^s$. Again, on the 9th February, the same star, viewed *from the same place*, passed, when the clock showed $8^h. 31^m. 37^s$. How has my clock performed? — OPERATION: The interval is ten days, or Rev^s,* the quantity answering to which in this Table is $39^m. 19^s$, to be subtracted from what it showed on the 30th of Jan., viz.:

	$9^h. 11^m. 4^s$
Acceleration for ten revolutions........	39. 19
What the clock should show	8. 31. 45
But it showed	8. 31. 37
Consequently the clock has lost........	0. 0. 8

The clock being *once set right*, its error, by this process, may be always ascertained.

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* See Explanation of this Table.

TABLE H.

For reducing SIDEREAL to MEAN TIME.

M.	H. 0	Hour. 1	Hours. 2	Hours. 3	Hours. 4	Hours. 5	Hours. 6	Hours. 7	Hours. 8	Hours. 9	Hours. 10	Hours. 11	M.
	s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	M. s.	
0	0	0. 10	0. 20	0. 29	0. 39	0. 49	0. 59	1. 9	1. 19	1. 28	1. 38	1. 48	0
1	0	0. 10	0. 20	0. 30	0. 39	0. 49	0. 59	1. 9	1. 19	1. 29	1. 38	1. 48	1
2	0	0. 10	0. 20	0. 30	0. 40	0. 49	0. 59	1. 9	1. 19	1. 29	1. 39	1. 48	2
3	0	0. 10	0. 20	0. 30	0. 40	0. 50	0. 59	1. 9	1. 19	1. 29	1. 39	1. 49	3
4	1	0. 10	0. 20	0. 30	0. 40	0. 50	1. 0	1. 9	1. 19	1. 29	1. 39	1. 49	4
5	1	0. 11	0. 20	0. 30	0. 40	0. 50	1. 0	1. 10	1. 19	1. 29	1. 39	1. 49	5
6	1	0. 11	0. 21	0. 30	0. 40	0. 50	1. 0	1. 10	1. 20	1. 29	1. 39	1. 49	6
7	1	0. 11	0. 21	0. 31	0. 40	0. 50	1. 0	1. 10	1. 20	1. 30	1. 39	1. 49	7
8	1	0. 11	0. 21	0. 31	0. 41	0. 50	1. 0	1. 10	1. 20	1. 30	1. 40	1. 49	8
9	1	0. 11	0. 21	0. 31	0. 41	0. 51	1. 0	1. 10	1. 20	1. 30	1. 40	1. 50	9
10	2	0. 11	0. 21	0. 31	0. 41	0. 51	1. 1	1. 10	1. 20	1. 30	1. 40	1. 50	10
11	2	0. 12	0. 21	0. 31	0. 41	0. 51	1. 1	1. 11	1. 20	1. 30	1. 40	1. 50	11
12	2	0. 12	0. 22	0. 31	0. 41	0. 51	1. 1	1. 11	1. 21	1. 30	1. 40	1. 50	12
13	2	0. 12	0. 22	0. 32	0. 41	0. 51	1. 1	1. 11	1. 21	1. 31	1. 40	1. 50	13
14	2	0. 12	0. 22	0. 32	0. 42	0. 51	1. 1	1. 11	1. 21	1. 31	1. 41	1. 50	14
15	2	0. 12	0. 22	0. 32	0. 42	0. 52	1. 1	1. 11	1. 21	1. 31	1. 41	1. 51	15
16	3	0. 12	0. 22	0. 32	0. 42	0. 52	1. 2	1. 11	1. 21	1. 31	1. 41	1. 51	16
17	3	0. 13	0. 22	0. 32	0. 42	0. 52	1. 2	1. 12	1. 21	1. 31	1. 41	1. 51	17
18	3	0. 13	0. 23	0. 32	0. 42	0. 52	1. 2	1. 12	1. 22	1. 31	1. 41	1. 51	18
19	3	0. 13	0. 23	0. 33	0. 42	0. 52	1. 2	1. 12	1. 22	1. 32	1. 41	1. 51	19
20	3	0. 13	0. 23	0. 33	0. 43	0. 52	1. 2	1. 12	1. 22	1. 32	1. 42	1. 51	20
21	3	0. 13	0. 23	0. 33	0. 43	0. 53	1. 2	1. 12	1. 22	1. 32	1. 42	1. 52	21
22	4	0. 13	0. 23	0. 33	0. 43	0. 53	1. 3	1. 12	1. 22	1. 32	1. 42	1. 52	22
23	4	0. 14	0. 23	0. 33	0. 43	0. 53	1. 3	1. 13	1. 22	1. 32	1. 42	1. 52	23
24	4	0. 14	0. 24	0. 33	0. 43	0. 53	1. 3	1. 13	1. 23	1. 32	1. 42	1. 52	24
25	4	0. 14	0. 24	0. 34	0. 43	0. 53	1. 3	1. 13	1. 23	1. 33	1. 42	1. 52	25
26	4	0. 14	0. 24	0. 34	0. 44	0. 53	1. 3	1. 13	1. 23	1. 33	1. 43	1. 52	26
27	4	0. 14	0. 24	0. 34	0. 44	0. 54	1. 3	1. 13	1. 23	1. 33	1. 43	1. 53	27
28	5	0. 14	0. 24	0. 34	0. 44	0. 54	1. 4	1. 13	1. 23	1. 33	1. 43	1. 53	28
29	5	0. 15	0. 24	0. 34	0. 44	0. 54	1. 4	1. 14	1. 23	1. 33	1. 43	1. 53	29
30	5	0. 15	0. 25	0. 34	0. 44	0. 54	1. 4	1. 14	1. 24	1. 33	1. 43	1. 53	30
31	5	0. 15	0. 25	0. 35	0. 44	0. 54	1. 4	1. 14	1. 24	1. 34	1. 43	1. 53	31
32	5	0. 15	0. 25	0. 35	0. 45	0. 54	1. 4	1. 14	1. 24	1. 34	1. 44	1. 53	32
33	5	0. 15	0. 25	0. 35	0. 45	0. 55	1. 4	1. 14	1. 24	1. 34	1. 44	1. 54	33
34	6	0. 15	0. 25	0. 35	0. 45	0. 55	1. 5	1. 14	1. 24	1. 34	1. 44	1. 54	34
35	6	0. 16	0. 25	0. 35	0. 45	0. 55	1. 5	1. 15	1. 24	1. 34	1. 44	1. 54	35
36	6	0. 16	0. 26	0. 35	0. 45	0. 55	1. 5	1. 15	1. 25	1. 34	1. 44	1. 54	36
37	6	0. 16	0. 26	0. 36	0. 45	0. 55	1. 5	1. 15	1. 25	1. 35	1. 44	1. 54	37
38	6	0. 16	0. 26	0. 36	0. 46	0. 55	1. 5	1. 15	1. 25	1. 35	1. 45	1. 54	38
39	6	0. 16	0. 26	0. 36	0. 46	0. 56	1. 5	1. 15	1. 25	1. 35	1. 45	1. 55	39
40	7	0. 16	0. 26	0. 36	0. 46	0. 56	1. 6	1. 15	1. 25	1. 35	1. 45	1. 55	40
41	7	0. 17	0. 26	0. 36	0. 46	0. 56	1. 6	1. 16	1. 25	1. 35	1. 45	1. 55	41
42	7	0. 17	0. 27	0. 36	0. 46	0. 56	1. 6	1. 16	1. 26	1. 35	1. 45	1. 55	42
43	7	0. 17	0. 27	0. 37	0. 46	0. 56	1. 6	1. 16	1. 26	1. 36	1. 45	1. 55	43
44	7	0. 17	0. 27	0. 37	0. 47	0. 56	1. 6	1. 16	1. 26	1. 36	1. 46	1. 55	44
45	7	0. 17	0. 27	0. 37	0. 47	0. 57	1. 6	1. 16	1. 26	1. 36	1. 46	1. 56	45
46	8	0. 17	0. 27	0. 37	0. 47	0. 57	1. 7	1. 16	1. 26	1. 36	1. 46	1. 56	46
47	8	0. 18	0. 27	0. 37	0. 47	0. 57	1. 7	1. 17	1. 26	1. 36	1. 46	1. 56	47
48	8	0. 18	0. 28	0. 37	0. 47	0. 57	1. 7	1. 17	1. 27	1. 36	1. 46	1. 56	48
49	8	0. 18	0. 28	0. 38	0. 47	0. 57	1. 7	1. 17	1. 27	1. 36	1. 46	1. 56	49
50	8	0. 18	0. 28	0. 38	0. 48	0. 57	1. 7	1. 17	1. 27	1. 37	1. 46	1. 56	50
51	8	0. 18	0. 28	0. 38	0. 48	0. 58	1. 7	1. 17	1. 27	1. 37	1. 47	1. 56	51
52	9	0. 18	0. 28	0. 38	0. 48	0. 58	1. 8	1. 17	1. 27	1. 37	1. 47	1. 57	52
53	9	0. 19	0. 28	0. 38	0. 48	0. 58	1. 8	1. 17	1. 27	1. 37	1. 47	1. 57	53
54	9	0. 19	0. 29	0. 38	0. 48	0. 58	1. 8	1. 18	1. 27	1. 37	1. 47	1. 57	54
55	9	0. 19	0. 29	0. 39	0. 48	0. 58	1. 8	1. 18	1. 27	1. 37	1. 47	1. 57	55
56	9	0. 19	0. 29	0. 39	0. 48	0. 58	1. 8	1. 18	1. 28	1. 38	1. 47	1. 57	56
57	9	0. 19	0. 29	0. 39	0. 49	0. 58	1. 8	1. 18	1. 28	1. 38	1. 48	1. 57	57
58	10	0. 19	0. 29	0. 39	0. 49	0. 59	1. 8	1. 18	1. 28	1. 38	1. 48	1. 58	58
59	10	0. 20	0. 29	0. 39	0. 49	0. 59	1. 9	1. 18	1. 28	1. 38	1. 48	1. 58	59
60	10	0. 20	0. 29	0. 39	0. 49	0. 59	1. 9	1. 19	1. 28	1. 38	1. 48	1. 58	60

TABLE H.

For reducing SIDEREAL to MEAN TIME.

M.	Hours. 12	Hours. 13	Hours. 14	Hours. 15	Hours. 16	Hours. 17	Hours. 18	Hours. 19	Hours. 20	Hours. 21	Hours. 22	Hours. 23	M.
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	
0	1.58	2. 8	2.18	2.27	2.37	2.47	2.57	3. 7	3.17	3.26	3.36	3.46	0
1	1.58	2. 8	2.18	2.28	2.37	2.47	2.57	3. 7	3.17	3.27	3.36	3.46	1
2	1.58	2. 8	2.18	2.28	2.38	2.47	2.57	3. 7	3.17	3.27	3.37	3.46	2
3	1.58	2. 8	2.18	2.28	2.38	2.48	2.57	3. 7	3.17	3.27	3.37	3.47	3
4	1.59	2. 8	2.18	2.28	2.38	2.48	2.58	3. 7	3.17	3.27	3.37	3.47	4
5	1.59	2. 9	2.18	2.28	2.38	2.48	2.58	3. 8	3.17	3.27	3.37	3.47	5
6	1.59	2. 9	2.19	2.28	2.38	2.48	2.58	3. 8	3.18	3.27	3.37	3.47	6
7	1.59	2. 9	2.19	2.29	2.38	2.48	2.58	3. 8	3.18	3.28	3.37	3.47	7
8	1.59	2. 9	2.19	2.29	2.39	2.48	2.58	3. 8	3.18	3.28	3.38	3.47	8
9	1.59	2. 9	2.19	2.29	2.39	2.49	2.58	3. 8	3.18	3.28	3.38	3.48	9
10	2. 0	2. 9	2.19	2.29	2.39	2.49	2.59	3. 8	3.18	3.28	3.38	3.48	10
11	2. 0	2.10	2.19	2.29	2.39	2.49	2.59	3. 9	3.18	3.28	3.38	3.48	11
12	2. 0	2.10	2.20	2.29	2.39	2.49	2.59	3. 9	3.19	3.28	3.38	3.48	12
13	2. 0	2.10	2.20	2.30	2.39	2.49	2.59	3. 9	3.19	3.29	3.38	3.48	13
14	2. 0	2.10	2.20	2.30	2.40	2.49	2.59	3. 9	3.19	3.29	3.39	3.48	14
15	2. 0	2.10	2.20	2.30	2.40	2.50	2.59	3. 9	3.19	3.29	3.39	3.49	15
16	2. 1	2.10	2.20	2.30	2.40	2.50	3. 0	3. 9	3.19	3.29	3.39	3.49	16
17	2. 1	2.11	2.20	2.30	2.40	2.50	3. 0	3.10	3.19	3.29	3.39	3.49	17
18	2. 1	2.11	2.21	2.30	2.40	2.50	3. 0	3.10	3.20	3.29	3.39	3.49	18
19	2. 1	2.11	2.21	2.31	2.40	2.50	3. 0	3.10	3.20	3.30	3.39	3.49	19
20	2. 1	2.11	2.21	2.31	2.41	2.50	3. 0	3.10	3.20	3.30	3.40	3.49	20
21	2. 1	2.11	2.21	2.31	2.41	2.51	3. 0	3.10	3.20	3.30	3.40	3.50	21
22	2. 2	2.11	2.21	2.31	2.41	2.51	3. 1	3.10	3.20	3.30	3.40	3.50	22
23	2. 2	2.12	2.21	2.31	2.41	2.51	3. 1	3.11	3.20	3.30	3.40	3.50	23
24	2. 2	2.12	2.22	2.31	2.41	2.51	3. 1	3.11	3.21	3.30	3.40	3.50	24
25	2. 2	2.12	2.22	2.32	2.41	2.51	3. 1	3.11	3.21	3.31	3.40	3.50	25
26	2. 2	2.12	2.22	2.32	2.42	2.51	3. 1	3.11	3.21	3.31	3.41	3.50	26
27	2. 2	2.12	2.22	2.22	2.42	2.52	3. 1	3.11	3.21	3.31	3.41	3.51	27
28	2. 3	2.12	2.22	2.32	2.42	2.52	3. 2	3.11	3.21	3.31	3.41	3.51	28
29	2. 3	2.13	2.22	2.32	2.42	2.52	3. 2	3.12	3.21	3.31	3.41	3.51	29
30	2. 3	2.13	2.23	2.32	2.42	2.52	3. 2	3.12	3.22	3.31	3.41	3.51	30
31	2. 3	2.13	2.23	2.33	2.42	2.52	3. 2	3.12	3.22	3.31	3.41	3.51	31
32	2. 3	2.13	2.23	2.33	2.43	2.52	3. 2	3.12	3.22	3.32	3.41	3.51	32
33	2. 3	2.13	2.23	2.33	2.43	2.53	3. 2	3.12	3.22	3.32	3.42	3.51	33
34	2. 4	2.13	2.23	2.33	2.43	2.53	3. 3	3.12	3.22	3.32	3.42	3.52	34
35	2. 4	2.14	2,23	2.33	2.43	2.53	3. 3	3.12	3.22	3.32	3.42	3.52	35
36	2. 4	2.14	2.24	2.33	2.43	2.53	3. 3	3.13	3.22	3.32	3.42	3.52	36
37	2. 4	2.14	2.24	2.34	2.43	2.53	3. 3	3.13	3.23	3.32	3.42	3.52	37
38	2. 4	2.14	2.24	2.34	2.43	2.53	3. 3	3.13	3.23	3.33	3.42	3.52	38
39	2. 4	2.14	2.24	2.34	2.44	2.53	3. 3	3.13	3.23	3.33	3.43	3.52	39
40	2. 5	2.14	2.24	2.34	2.44	2.54	3. 3	3.13	3.23	3.33	3.43	3.53	40
41	2. 5	2.14	2.24	2.34	2.44	2.54	3. 4	3.13	3.23	3.33	3.43	3.53	41
42	2. 5	2.15	2.24	2.34	2.44	2.54	3. 4	3.14	3.23	3.33	3.43	3.53	42
43	2. 5	2.15	2.25	2.34	2.44	2.54	3. 4	3.14	3.24	3.33	3.43	3.53	43
44	2. 5	2.15	2.25	2.35	2.44	2.54	3. 4	3.14	3.24	3.34	3.43	3.53	44
45	2. 5	2.15	2.25	2.35	2.45	2.54	3. 4	3.14	3.24	3.34	3.44	3.53	45
46	2. 5	2.15	2.25	2.35	2.45	2.55	3. 4	3.14	3.24	3.34	3.44	3.54	46
47	2. 6	2.15	2.25	2.35	2.45	2.55	3. 5	3.14	3.24	3.34	3.44	3.54	47
48	2. 6	2.16	2.25	2.35	2.45	2.55	3. 5	3.15	3.24	3.34	3.44	3.54	48
49	2. 6	2.16	2.26	2.35	2.45	2.55	3. 5	3.15	3.25	3.34	3.44	3.54	49
50	2. 6	2.16	2.26	2.36	2.45	2.55	3. 5	3.15	3.25	3.35	3.44	3.54	50
51	2. 6	2.16	2.26	2.36	2.46	2.55	3. 5	3.15	3.25	3.35	3.45	3.54	51
52	2. 6	2.16	2.26	2.36	2.46	2.56	3. 5	3.15	3.25	3.35	3.45	3.55	52
53	2. 7	2.16	2.26	2.36	2.46	2.56	3. 6	3.15	3.25	3.35	3.45	3.55	53
54	2. 7	2.17	2.26	2.36	2.46	2.56	3. 6	3.16	3.25	3.35	3.45	3.55	54
55	2. 7	2.17	2.27	2.36	2.46	2.56	3. 6	3.16	3.26	3.35	3.45	3.55	55
56	2. 7	2.17	2.27	2.37	2.46	2.56	3. 6	3.16	3.26	3.36	3.45	3.55	56
57	2. 7	2.17	2.27	2.37	2.47	2.56	3. 6	3.16	3.26	3.36	3.46	3.55	57
58	2. 7	2.17	2.27	2.37	2.47	2.57	3. 6	3.16	3.26	3.36	3.46	3.56	58
59	2. 8	2.17	2.27	2.37	2.47	2.57	3. 7	3.16	3.26	3.36	3.46	3.56	59
60	2. 8	2.18	2.27	2.37	2.47	2.57	3. 7	3.17	3.26	3.36	3.46	3.56	60

TABLE I.

TRUE MERIDIONAL ALTITUDES of STARS in NORTH LATITUDE.—1844.

Lat.	Star N° 1.	Star N° 2.	Star N° 3.	Star N° 4.	Star N° 5.	Star N° 6.	Star N° 7.	Star N° 8.	Star N° 9.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	61.46 N	75.41 N	71. 9 S	55.12 N	31.58 S	67.17 N	86.19 S	86.32 N	40.42 N
1	62.46	76.41	70. 9	56.12	30.58	68.17	85.19	87.32	41.42
2	63.46	77.41	69. 9	57.12	29.58	69.17	84.19	88.32	42.42
3	64.46	78.41	68. 9	58.12	28.58	70.17	83.19	89.32 N	43.42
4	65.46	79.41	67. 9	59.12	27.58	71.11	82.19	89.28 S	44.42
5	66.46	80.41	66. 9	60.12	26.58	72.17	81.19	88.28	45.42
6	67.46	81.41	65. 9	61.12	25.58	73.17	80.19	87.28	46.42
7	68.46	82.41	64. 9	62.12	24.58	74.17	79.19	86.28	47.42
8	69.46	83.41	63. 9	63.12	23.58	75.17	78.19	85.28	48.42
9	70.46	84.41	62. 9	64.12	22.58	76.17	77.19	84.28	49.42
10	71.46	85.41	61. 9	65.12	21.58	77.17	76.19	83.28	50.42
11	72.46	86 41	60. 9	66.12	20.58	78.17	75.19	82.28	51.42
12	73.46	87.41	59. 9	67.12	19.58	79.17	74.19	81.28	52.42
13	74.46	88.41	58. 9	68.12	18.58	80.17	73.19	80.28	53.42
14	75.46	89.41 N	57. 9	69.12	17.58	81.17	72.19	79.28	54.42
15	76.46	89.19 S	56. 9	70.12	16.58	82.17	71.19	78.28	55.42
16	77.46	88.19	55. 9	71.12	15.58	83.17	70.19	77.28	56.42
17	78.46	87.19	54. 9	72.12	14.58	84.17	69.19	76.28	57.42
18	79.46	86.19	53. 9	73.12	13.58	85.17	68.19	75.28	58.42
19	80.46	85.19	52. 9	74.12	12.58	86.17	67.19	74.28	59.42
20	81.46	84.19	51. 9	75.12	11.58	87.17	66.19	73.28	60.42
21	82.46	83.19	50. 9	76.12	10.58	88.17	65.19	72.28	61.42
22	83.46	82.19	49. 9	77.12	9.58	89.17 N	64.19	71.28	62.42
23	84.46	81.19	48. 9	78.12	8.58	89.43 S	63.19	70.28	63.42
24	85.46	80.19	47. 9	79.12	7.58	88.43	62.19	69.28	64.42
25	86.46	79.19	46. 9	80.12	6.58	87.43	61.19	68.28	65.42
26	87.46	78.19	45. 9	81.12	5.58	86.43	60.19	67.28	66.42
27	88.46	77.19	44. 9	82.12	4.58	85.43	59.19	66.28	67.42
28	89.46 N	76.19	43. 9	83.12	3.58	84.43	58.19	65.28	68.42
29	89.14 S	75.19	42. 9	84.12	2.58	83.43	57.19	64.28	69.42
30	88.14	74.19	41. 9	85.12	1.58	82.43	56.19	63.28	70.42
31	87.14	73.19	40. 9	86.12	0.58	81.43	55.19	62.28	71.42
32	86.14	72.19	39. 9	87.12		80.43	54.19	61.28	72.42
33	85.14	71.19	38. 9	88.12	Below the Horizon.	79.43	53.19	60.28	73.42
34	84.14	70.19	37. 9	89.12 N		78.43	52.19	59.28	74.42
35	83.14	69.19	36. 9	89.48 S		77.43	51.19	58.28	75.42
36	82.14	68.19	35. 9	88.48		76.43	50.19	57.28	76.42
37	81.14	67.19	34. 9	87.48		75.43	49.19	56.28	77.42
38	80.14	66.19	33. 9	86.48		74.43	48.19	55,28	78.42
39	79.14	65.19	32. 9	85.48		73.43	47.19	54.28	79.42
40	78.14	64.19	31. 9	84.48		72.43	46.19	53.28	80.42
41	77.14	63.19	30. 9	83.48		71.43	45.19	52.28	81.42
42	76.14	62.19	29. 9	82.48		70.43	44.19	51.28	82.42
43	75.14	61.19	28. 9	81.48		69.43	43.19	50.28	83.42
44	74.14	60.19	27. 9	80.48		68.43	42.19	49.28	84.42
45	73.14	59.19	26. 9	79.48		67.43	41.19	48.28	85.42
46	72.14	58.19	25. 9	78.48		66.43	40.19	47.28	86.42
47	71.14	57.19	24. 9	77.48		65.43	39.19	46.28	87.42
48	70.14	56.19	23. 9	76.48		64.43	38.19	45.28	88.42
49	69.14	55.19	22. 9	75.48		63.43	37.19	44.28	89.42 N
50	68.14	54.19	21. 9	74.48		62.43	36.19	43.28	89.18 S
51	67.14	53.19	20. 9	73.48		61.43	35.19	42.28	88.18
52	66.14	52.19	19. 9	72.48		60.43	34.19	41.28	87.18
53	65.14	51.19	18. 9	71.48		59.43	33.19	40.28	86.18
54	64.14	50.19	17. 9	70.48		58.43	32.19	39.28	85.18
55	63.14	49.19	16. 9	69.48		57.43	31.19	38.28	84.18
56	62.14	48.19	15. 9	68.48		56.43	30.19	37.28	83.18
57	61.14	47.19	14. 9	67.48		55.43	29.19	36.28	82.18
58	60.14	46.19	13. 9	66.48		54.43	28.19	35.28	81.18
59	59.14	45.19	12. 9	65.48		53.43	27.19	34.28	80.18
60	58.14	44.19	11. 9	64.48		52.43	26.19	33.28	79.18
Dec.	28°. 14′N	14°. 19′N	18°. 51′ S	34°. 48′N	58°. 2′ S	22°. 43′N	3°. 41′ S	3°. 28′ N	49°. 18′N
Correction of one mile + or − Mer. Alt. for periods, as expressed below.									
	− or + in 3 yrs.	− or + in 3 yrs.	+ in 3 yrs.	− or + in 3 yrs.	+ in 3 yrs.	− or + in 3½ yrs.	+ in 4 yrs.	− or + in 4 yrs.	− or + in 5 yrs.

TABLE I.

True Meridional Altitudes of Stars in North Latitude.—1844.

Lat.	Star N° 10.	Star N° 11.	Star N° 12.	Star No. 13	Star N° 14.	Star N° 15.	Star N° 16.	Star N° 17.	Star N° 18.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	73.49 N	44.10 N	81.37 S	61.32 N	82.38 N	37.23 S	73.30 S	57.47 N	84.23 N
1	74.49	45.10	80.37	62.32	83.38	36.23	72.30	58.47	85.23
2	75.49	46.10	79.37	63.32	84.38	35.23	71.30	59.47	86.23
3	76.49	47.10	78.37	64.32	85.38	34.23	70.30	60.47	87.23
4	77.49	48.10	77.37	65.32	86.38	33.23	69.30	61.47	88.23
5	78.49	49.10	76.37	66.32	87.38	32.23	68.30	62.47	89.23 N
6	79.49	50.10	75.37	67.32	88.38	31.23	67.30	63.47	89.37 S
7	80.49	51.10	74.37	68.32	89.38 N	30.23	66.30	64.47	88.37
8	81.49	52.10	73.37	69.32	89.22 S	29.23	65.30	65.47	87.37
9	82.49	53.10	72.37	70.32	88.22	28.23	64.30	66.47	86.37
10	83.49	54.10	71.37	71.32	87.22	27.23	63.30	67.47	85.37
11	84.49	55.10	70.37	72.32	86.22	26.23	62.30	68.47	84.37
12	85.49	56.10	69.37	73.32	85.22	25.23	61.30	69.47	83.37
13	86.49	57.10	68.37	74.32	84.22	24.23	60.30	70.47	82.37
14	87.49	58.10	67.37	75.32	83.22	23.23	59.30	71.47	81.37
15	88.49	59.10	66.37	76.32	82.22	22.23	58.30	72.47	80.37
16	89.49 N	60.10	65.37	77.32	81.22	21.23	57.30	73.47	79.37
17	89.11 S	61.10	64.37	78.32	80.22	20.23	56.30	74.47	78.37
18	88.11	62.10	63.37	79.32	79.22	19.23	55.30	75.47	77.37
19	87.11	63.10	62.37	80.32	78.22	18.23	54.30	76.47	76.37
20	86.11	64.10	61.37	81.32	77.22	17.23	53.30	77.47	75.37
21	85.11	65.10	60.37	82.32	76.22	16.23	52.30	78.47	74.37
22	84.11	66.10	59.37	83.32	75.22	15.23	51.30	79.47	73.37
23	83.11	67.10	58.37	84.32	74.22	14.23	50.30	80.47	72.37
24	82.11	68.10	57.37	85.32	73.22	13.23	49.30	81.47	71.37
25	81.11	69.10	56.37	86.32	72.22	12.23	48.30	82.47	70.37
26	80.11	70.10	55.37	87.32	71.22	11.23	47.30	83.47	69.37
27	79.11	71.10	54.37	88.32	70.22	10.23	46.30	84.47	68.37
28	78.11	72.10	53.37	89.32 N	69.22	9.23	45.30	85.47	67.37
29	77.11	73.10	52.37	89.28 S	68.22	8.23	44.30	86.47	66.37
30	76.11	74.10	51.37	88.28	67.22	7.23	43.30	87.47	65.37
31	75.11	75.10	50.37	87.28	66.22	6.23	42.30	88.47	64.37
32	74.11	76.10	49.37	86.28	65.22	5.23	41.30	89.47 N	63.37
33	73.11	77.10	48.37	85.28	64.22	4.23	40.30	89.13 S	62.37
34	72.11	78.10	47.37	84.28	63.22	3.23	39.30	88.13	61.37
35	71.11	79.10	46.37	83.28	62.22	2.23	38.30	87.13	60.37
36	70.11	80.10	45.37	82.28	61.22	1.23	37.30	86.13	59.37
37	69.11	81.10	44.37	81.28	60.22	0.23	36.30	85.13	58.37
38	68.11	82.10	43.37	80.28	59.22		35.30	84.13	57.37
39	67.11	83.10	42.37	79.28	58.22	Below	34.30	83.13	56.37
40	66.11	84.10	41.37	78.28	57.22	the	33.30	82.13	55.37
41	65.11	85.10	40.37	77.28	56.22		32.30	81.13	54.37
42	64.11	86.10	39.37	76.28	55.22	Horizon.	31.30	80.13	53.37
43	63.11	87.10	38.37	75.28	54.22		30.30	79.13	52.37
44	62.11	88.10	37.37	74.28	53.22		29.30	78.13	51.37
45	61.11	89.10 N	36.37	73.28	52.22		28.30	77.13	50.37
46	60.11	89.50 S	35.37	72.28	51.22		27.30	76.13	49.37
47	59.11	88.50	34.37	71.28	50.22		26.30	75.13	48.37
48	58.11	87.50	33.37	70.28	49.22		25.30	74.13	47.37
49	57.11	86.50	32.37	69.28	48.22		24.30	73.13	46.37
50	56.11	85.50	31.37	68.28	47.22		23.30	72.13	45.37
51	55.11	84.50	30.37	67.28	46.22		22.30	71.13	44.37
52	54.11	83.50	29.37	66.28	45.22		21.30	70.13	43.37
53	53.11	82.50	28.37	65.28	44.22		20.30	69.13	42.37
54	52.11	81.50	27.37	64.28	43.22		19.30	68.13	41.37
55	51.11	80.50	26.37	63.28	42.22		18.30	67.13	40.37
56	50.11	79.50	25.37	62.28	41.22		17.30	66.13	39.37
57	49.11	78.50	24.37	61.28	40.22		16.30	65.13	38.37
58	48.11	77.50	23.37	60.28	39.22		15.30	64.13	37.37
59	47.11	76.50	22.37	59.28	38.22		14.30	63.13	36.37
60	46.11	75.50	21.37	58.28	37.22		13.30	62.13	35.37
Dec.	16°.11′N	45°.50′N	8°.23′S	28°.28′N	7°.22′N	52°.37′S	16°.30′S	32°.13′N	5°.37′N
	Correction of one mile + or − Mer. Alt. for periods, as expressed below.								
	− or + in 6 yrs.	− or + in 12 yrs.	+ in 13 yrs.	− or + in 16 yrs.	− or + in 44 yrs.	− in 36 yrs.	− in 14 yrs.	+ or − in 8 yrs.	+ or − in 7 yrs.

TABLE I.

True Meridional Altitudes of Stars in North Latitude.—1844.

Lat.	Star N° 19.	Star N° 20.	Star N° 21.	Star N° 22.	Star N° 23.	Star N° 24.	Star N° 25.	Star N° 26.	Star N° 27.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	61.36 N	20.55 S	82. 1 S	77.16 N	27.24 N	74.33 N	27.46 S	79.39 S	39.54 N
1	62.36	19.55	81. 1	78.16	28.24	75.33	26.46	78.39	40.54
2	63.36	18.55	80. 1	79.16	29.24	76.33	25.46	77.39	41.54
3	64.36	17.55	79. 1	80.16	30.24	77.33	24.46	76.39	42.54
4	65.36	16.55	78. 1	81.16	31.24	78.33	23.46	75.39	43.54
5	66.36	15.55	77. 1	82.16	32.24	79.33	22.46	74.39	44.54
6	67.36	14.55	76. 1	83.16	33.24	80.33	21.46	73.39	45.54
7	68.36	13.55	75. 1	84.16	34.24	81.33	20.46	72.39	46.54
8	69.36	12.55	74. 1	85.16	35.24	82.33	19.46	71.39	47.54
9	70.36	11.55	73. 1	86.16	36.24	83.33	18.46	70.39	48.54
10	71.36	10.55	72. 1	87.16	37.24	84.33	17.46	69.39	49.54
11	72.36	9.55	71. 1	88.16	38.24	85.33	16.46	68.39	50.54
12	73.36	8.55	70. 1	89.16 N	39.24	86.33	15.46	67.39	51.54
13	74.36	7.55	69. 1	89.44 S	40.24	87.33	14.46	66.39	52.54
14	75.36	6.55	68. 1	88.44	41.24	88.33	13.46	65.39	53.54
15	76.36	5.55	67. 1	87.44	42.24	89.33 N	12.46	64.39	54.54
16	77.36	4.55	66. 1	86.44	43.24	89.27 S	11.46	63.39	55.54
17	78.36	3.55	65. 1	85.44	44.24	88.27	10.46	62.39	56.54
18	79.36	2.55	64. 1	84.44	45.24	87.27	9.46	61.39	57.54
19	80.36	1.55	63. 1	83.44	46.24	86.27	8.46	60.39	58.54
20	81.36	0.55	62. 1	82.44	47.24	85.27	7.46	59.39	59.54
21	82.36		61. 1	81.44	48.24	84.27	6.46	58.39	60.54
22	83.36		60. 1	80.44	49.24	83.27	5.46	57.39	61.54
23	84.36	Below	59. 1	79.44	50.24	82.27	4.46	56.39	62.54
24	85.36	the	58. 1	78.44	51.24	81.27	3.46	55.39	63.54
25	86.36	Horizon.	57. 1	77.44	52.24	80.27	2.46	54.39	64.54
26	87.36		56. 1	76.44	53.24	79.27	1.46	53.39	65.54
27	88.36		55. 1	75.44	54.24	78.27	0.46	52.39	66.54
28	89.36 N		54. 1	74.44	55.24	77.27		51.39	67.54
29	89.24 S		53. 1	73.44	56.24	76.27	Below	50.39	68.54
30	88.24		52. 1	72.44	57.24	75.27	the	49.39	69.54
31	87.24		51. 1	71.44	58.24	74.27	Horizon.	48.39	70.54
32	86.24		50. 1	70.44	59.24	73.27		47.39	71.54
33	85.24		49. 1	69.44	60.24	72.27		46.39	72.54
34	84.24		48. 1	68.44	61.24	71.27		45.39	73.54
35	83.24		47. 1	67.44	62.24	70.27		44.39	74.54
36	82.24		46. 1	66.44	63.24	69.27		43.39	75.54
37	81.24		45. 1	65.44	64.24	68.27		42.39	76.54
38	80.24		44. 1	64.44	65.24	67.27		41.39	77.54
39	79.24		43. 1	63.44	66.24	66.27		40.39	78.54
40	78.24		42. 1	62.44	67.24	65.27		39.39	79.54
41	77.24		41. 1	61.44	68.24	64.27		38.39	80.54
42	76.24		40. 1	60.44	69.24	63.27		37.39	81.54
43	75.24		39. 1	59.44	70.24	62.27		36.39	82.54
44	74.24		38. 1	58.44	71.24	61.27		35.39	83.54
45	73.24		37. 1	57.44	72.24	60.27		34.39	84.54
46	72.24		36. 1	56.44	73.24	59.27		33.39	85.54
47	71.24		35. 1	55.44	74.24	58.27		32.39	86.54
48	70.24		34. 1	54.44	75.24	57.27		31.39	87.54
49	69.24		33. 1	53.44	76.24	56.27		30.39	88.54
50	68.24		32. 1	52.44	77.24	55.27		29.39	89.54 N
51	67.24		31. 1	51.44	78.24	54.27		28.39	89. 6 S
52	66.24		30. 1	50.44	79.24	53.27		27.39	88. 6
53	65.24		29. 1	49.44	80.24	52.27		26.39	87. 6
54	64.24		28. 1	48.44	81.24	51.27		25.39	86. 6
55	63.24		27. 1	47.44	82.24	50.27		24.39	85. 6
56	62.24		26. 1	46.44	83.24	49.27		23.39	84. 6
57	61.24		25. 1	45.44	84.24	48.27		22.39	83. 6
58	60.24		24. 1	44.44	85.24	47.27		21.39	82. 6
59	59.24		23. 1	43.44	86.24	46.27		20.39	81. 6
60	58.24		22. 1	42.44	87.24	45.27		19.39	80. 6
Dec.	28°.24′N	69°.5′S	7°.59′S	12°.44′N	62°.36′N	15°.27′N	62°.14′S	10°.21′S	50°.6′N
Correction of one mile + or − Mer. Alt. for periods, as expressed below.									
	+ or − in 7½ yrs.	− in 4 yrs.	− in 4 yrs.	+ or − in 3½ yrs.	+ in 3 yrs.	+ or − in 3 yrs.	− in 3 yrs.	− in 3 yrs.	+ or − in 3 yrs.

TABLE I.

TRUE MERIDIONAL ALTITUDES of STARS in NORTH LATITUDE.—1844.

Lat.	Star N° 28.	Star N° 29.	Star N° 30.	Star N° 31.	Star N° 32.	Star N° 33.	Star N° 34.	Star N° 35.	Star N° 36.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	30.23 S	70. 0 N	29.49 S	81.12 S	62.45 N	83. 5 N	63.55 S	75.26 N	77.19 N
1	29.23	71. 0	28.49	80.12	63.45	84. 5	62.55	76.26	78.19
2	28.23	72. 0	27.49	79.12	64.45	85. 5	61.55	77.26	79.19
3	27.23	73. 0	26.49	78.12	65.45	86. 5	60.55	78.26	80.19
4	26.23	74. 0	25.49	77.12	66.45	87. 5	59.55	79.26	81.19
5	25.23	75. 0	24.49	76.12	67.45	88. 5	58.55	80.26	82.19
6	24.23	76. 0	23.49	75.12	68.45	89. 5 N	57.55	81.26	83.19
7	23.23	77. 0	22.49	74.12	69.45	89.55 S	56.55	82.26	84.19
5	22.23	78. 0	21.49	73.12	70.45	88.55	55.55	83.26	85.19
9	21.23	79. 0	20.49	72.12	71.45	87.55	54.55	84.26	86.19
10	20.23	80. 0	19.49	71.12	72.45	86.55	53.55	85.26	87.19
11	19.23	81. 0	18.49	70.12	73.45	85.55	52.55	86.26	88.19
12	18.23	82. 0	17.49	69.12	74.45	84.55	51.55	87.26	89.19 N
13	17.23	83. 0	16.49	68.12	75.45	83.55	50.55	88.26	89.41 S
14	16.23	84. 0	15.49	67.12	76.45	82.55	49.55	89.26 N	88.41
15	15.23	85. 0	14.49	66.12	77.45	81.55	48.55	89.34 S	87.41
16	14.23	86. 0	13.49	65.12	78.45	80.55	47.55	88.34	86.41
17	13.23	87. 0	12.49	64.12	79.45	79.55	46.55	87.34	85.41
18	12.23	88. 0	11.49	63.12	80.45	78.55	45.55	86.34	84.41
19	11.23	89. 0 N	10.49	62.12	81.45	77.55	44.55	85.34	83.41
20	10.23	90. 0	9.49	61.12	82.45	76.55	43.55	84.34	82.41
21	9.23	89. 0 S	8.49	60.12	83.45	75.55	42.55	83.34	81.41
22	8.23	88. 0	7.49	59.12	84.45	74.55	41.55	82.34	80.41
23	7.23	87. 0	6.49	58.12	85.45	73.55	40.55	81.34	79.41
24	6.23	86. 0	5.49	57.12	86.45	72.55	39.55	80.34	78.41
25	5.23	85. 0	4.49	56.12	87.45	71.55	38.55	79.34	77.41
26	4.23	84. 0	3.49	55.12	88.45	70.55	37.55	78.34	76.41
27	3.23	83. 0	2.49	54.12	89.45 N	69.55	36.55	77.34	75.41
28	2.23	82. 0	1.49	53.12	89.15 S	68.55	35.55	76.34	74.41
29	1.23	81. 0	0.49	52.12	88.15	67.55	34.55	75.34	73.41
30	0.23	80. 0	Below the Horizon.	51.12	87.15	66.55	33.55	74.34	72.41
31	Below the Horizon.	79. 0		50.12	86.15	65.55	32.55	73.34	71.41
32		78. 0		49.12	85.15	64.55	31.55	72.34	70.41
33		77. 0		48.12	84.15	63.55	30.55	71.34	69.41
34		76. 0		47.12	83.15	62.55	29.55	70.34	68.41
35		75. 0		46.12	82.15	61.55	28.55	69.34	67.41
36		74. 0		45.12	81.15	60.55	27.55	68.34	66.41
37		73. 0		44.12	80.15	59.55	26.55	67.34	65.41
38		72. 0		43.12	79.15	58.55	25.55	66.34	64.41
39		71. 0		42.12	78.15	57.55	24.55	65.34	63.41
40		70. 0		41.12	77.15	56.55	23.55	64.34	62.41
41		69. 0		40.12	76.15	55.55	22.55	63.34	61.41
42		68. 0		39.12	75.15	54.55	21.55	62.34	60.41
43		67. 0		38.12	74.15	53.55	20.55	61.34	59.41
44		66. 0		37.12	73.15	52.55	19.55	60.34	58.41
45		65. 0		36.12	72.15	51.55	18.55	59.34	57.41
46		64. 0		35.12	71.15	50.55	17.55	58.34	56.41
47		63. 0		34.12	70.15	49.55	16.55	57.34	55.41
48		62. 0		33.12	69.15	48.55	15.55	56.34	54.41
49		61. 0		32.12	68.15	47.55	14.55	55.34	53.41
50		60. 0		31.12	67.15	46.55	13.55	54.34	52.41
51		59. 0		30.12	66.15	45.55	12.55	53.34	51.41
52		58. 0		29.12	65.15	44.55	11.55	52.34	50.41
53		57. 0		28.12	64.15	43.55	10.55	51.34	49.41
54		56. 0		27.12	63.15	42.55	9.55	50.34	48.41
55		55. 0		26.12	62.15	41.55	8.55	49.34	47.41
56		54. 0		25.12	61.15	40.55	7.55	48.34	46.41
57		53. 0		24.12	60.15	39.55	6.55	47.34	45.41
58		52. 0		23.12	59.15	38.55	5.55	46.34	44.41
59		51. 0		22.12	58.15	37.55	4.55	45.34	43.41
60		50. 0		21.12	57.15	36.55	3.55	44.34	42.41
Dec.	59°.37′ S	20°.0′ N	60°.11′ S	8°.48′ S	27°.15′ N	6°.55′ N	26°.5′ S	14°.34′ N	12°.41′ N
Correction of one mile + or — Mer. Alt. for periods, as expressed below.									
	— in 3½ yrs.	+ or — in 3¾ yrs.	— in 3¾ yrs.	— in 4½ yrs.	+ or — in 4½ yrs.	+ or — in 5 yrs.	— in 7 yrs.	+ or — in 13½ yrs.	+ or — in 19½ yrs.

TABLE I.

TRUE MERIDIONAL ALTITUDES of STARS in NORTH LATITUDE.—1844.

Lat.	Star N° 37.	Star N° 38.	Star N° 39.	Star N° 40.	Star N° 41.	Star N° 42.	Star N° 43.	Star N° 44.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	38.29 N	51.22 N	81.32 N	32.46 S	45.16 N	42.17 S	59.33 S	75.38 N
1	39.29	52.22	82.32	31.46	46.16	41.17	58.33	76.38
2	40.29	53.22	83.32	30.46	47.16	40.17	57.33	77.38
3	41.29	54.22	84.32	29.46	48.16	39.17	56.33	78.38
4	42.29	55.22	85.32	28.46	49.16	38.17	55.33	79.38
5	43.29	56.22	86.32	27.46	50.16	37.17	54.33	80.38
6	44.29	57.22	87.32	26.46	51.16	36.17	53.33	81.38
7	45.29	58.22	88.32	25.46	52.16	35.17	52.33	82.38
8	46.29	59.22	89.32 N	24.46	53.16	34.17	51.33	83.38
9	47.29	60.22	89.28 S	23.46	54.16	33.17	50.33	84.38
10	48.29	61.22	88.28	22.46	55.16	32.17	49.33	85.38
11	49.29	62.22	87.28	21.46	56.16	31.17	48.33	86.38
12	50.29	63.22	86.28	20.46	57.16	30.17	47.33	87.38
13	51.29	64.22	85.28	19.46	58.16	29.17	46.33	88.38
14	52.29	65.22	84.28	18.46	59.16	28.17	45.33	89.38 N
15	53.29	66.22	83.28	17.46	60.16	27.17	44.33	89.22 S
16	54.29	67.22	82.28	16.46	61.16	26.17	43.33	88.22
17	55.29	68.22	81.28	15.46	62.16	25.17	42.33	87.22
18	56.29	69.22	80.28	14.46	63.16	24.17	41.33	86.22
19	57.29	70.22	79.28	13.46	64.16	23.17	40.33	85.22
20	58.29	71.22	78.28	12.46	65.16	22.17	39.33	84.22
21	59.29	72.22	77.28	11.46	66.16	21.17	38.33	83.22
22	60.29	73.22	76.28	10.46	67.16	20.17	37.33	82.22
23	61.29	74.22	75.28	9.46	68.16	19.17	36.33	81.22
24	62.29	75.22	74.28	8.46	69.16	18.17	35.33	80.22
25	63.29	76.22	73.28	7.46	70.16	17.17	34.33	79.22
26	64.29	77.22	72.28	6.46	71.16	16.17	33.33	78.22
27	65.29	78.22	71.28	5.46	72.16	15.17	32.33	77.22
28	66.29	79.22	70.28	4.46	73.16	14.17	31.33	76.22
29	67.29	80.22	69.28	3.46	74.16	13.17	30.33	75.22
30	68.29	81.22	68.28	2.46	75.16	12.17	29.33	74.22
31	69.29	82.22	67.28	1.46	76.16	11.17	28.33	73.22
32	70.29	83.22	66.28	0.46	77.16	10.17	27.33	72.22
33	71.29	84.22	65.28		78.16	9.17	26.33	71.22
34	72.29	85.22	64.28	Below the Horizon.	79.16	8.17	25.33	70.22
35	73.29	86.22	63.28		80.16	7.17	24.33	69.22
36	74.29	87.22	62.28		81.16	6.17	23.33	68.22
37	75.29	88.22	61.28		82.16	5.17	22.33	67.22
38	76.29	89.22 N	60.28		83.16	4.17	21.33	66.22
39	77.29	89.38 S	59.28		84.16	3.17	20.33	65.22
40	78.29	88.38	58.28		85.16	2.17	19.33	64.22
41	79.29	87.38	57.28		86.16	1.17	18.33	63.22
42	80.29	86.38	56.28		87.16	0.17	17.33	62.22
43	81.29	85.38	55.28		88.16		16.33	61.22
44	82.29	84.38	54.28		89.16 N	Below the Horizon.	15.33	60.22
45	83.29	83.38	53.28		89.44 S		14.33	59.22
46	84.29	82.38	52.28		88.44		13.33	58.22
47	85.29	81.38	51.28		87.44		12.33	57.22
48	86.29	80.38	50.28		86.44		11.33	56.22
49	87.29	79.38	49.28		85.44		10.33	55.22
50	88.29	78.38	48.28		84.44		9.33	54.22
51	89.29 N	77.38	47.28		83.44		8.33	53.22
52	89.31 S	76.32	46.28		82.44		7.33	52.22
53	88.31	75.38	45.28		81.44		6.33	51.22
54	87.31	74.38	44.28		80.44		5.33	50.22
55	86.31	73.38	43.28		79.44		4.33	49.22
56	85.31	72.38	42.28		78.44		3.33	48.22
57	84.31	71.38	41.28		77.44		2.33	47.22
58	83.31	70.38	40.28		76.44		1.33	46.22
59	82.31	69.38	39.28		75.44		0.33	45.22
60	81.31	68.38	38.28		74.44		Below Hor	44.22
Dec.	51°.31′ N	38°.38′ N	8°.28′ N	57°.14′ S	44°.44′ N	47°.43′ S	30°.27′ S	14°.22′ N
Correction of one mile + or — Mer. Alt. for periods, as expressed below.								
	+ or — in 85 yrs.	— or + in 20 yrs.	— or + in 6¾ yrs.	+ in 5½ yrs.	— or + in 4¾ yrs.	+ in 3½ yrs.	+ in 3¼ yrs.	— or + in 3¼ yrs.

TABLE K.

TRUE MERIDIONAL ALTITUDES of STARS in SOUTH LATITUDE.—1844.

Lat.	Star N° 1.	Star N° 2.	Star N° 3.	Star N° 4.	Star N° 5.	Star N° 6.	Star N° 7.	Star N° 8.	Star N° 9.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	61.46 N	75.41 N	71. 9 S	55.12 N	31.58 S	67.17 N	86.19 S	86.32 N	40.42 N
1	60.46	74.41	72. 9	54.12	32.58	66.17	87.19	85.32	39.42
2	59.46	73.41	73. 9	53.12	33.58	65.17	88.19	84.32	38.42
3	58.46	72.41	74. 9	52.12	34.58	64.17	89.19 S	83.52	37.42
4	57.46	71.41	75. 9	51.12	35.58	63.17	89.41 N	82.32	36.42
5	56.46	70.41	76. 9	50.12	36.58	62.17	88.41	81.32	35.42
6	55.46	69.41	77. 9	49.12	37.58	61.17	87.41	80.32	34.42
7	54.46	68.41	78. 9	48.12	38.58	60.17	86.41	79.32	33.42
8	53.46	67.41	79. 9	47.12	39.58	59.17	85.41	78.32	32.42
9	52.46	66.41	80. 9	46.12	40.58	58.17	84.41	77.32	31.42
10	51.46	65.41	81. 9	45.12	41.58	57.17	83.41	76.32	30.42
11	50.46	64.41	82. 9	44.12	42.58	56.17	82.41	75.32	29.42
12	49.46	63.41	83. 9	43.12	43.58	55.17	81.41	74.32	28.42
13	48.46	62.41	84. 9	42.12	44.58	54.17	80.41	73.32	27.42
14	47.46	61.41	85. 9	41.12	45.58	53.17	79.41	72.32	26.42
15	46.46	60.41	86. 9	40.12	46.58	52.17	78.41	71.32	25.42
16	45.46	59.41	87. 9	39.12	47.58	51.17	77.41	70.32	24.42
17	44.46	58.41	88. 9	38.12	48.58	50.17	76.41	69.32	23.42
18	43.46	57.41	89. 9 S	37.12	49.58	49.17	75.41	68.32	22.42
19	42.46	56.41	89.51 N	36.12	50.58	48.17	74.41	67.32	21.42
20	41.46	55.41	88.51	35.12	51.58	47.17	73.41	66.32	20.42
21	40.46	54.41	87.51	34.12	52.58	46.17	72.41	65.32	19.42
22	39.46	53.41	86.51	33.12	53.58	45.17	71.41	64.32	18.42
23	38.46	52.41	85.51	32.12	54.58	44.17	70.41	63.32	17.42
24	37.46	51.41	84.51	31.12	55.58	43.17	69.41	62.32	16.42
25	36.46	50.41	83.51	30.12	56.58	42.17	68.41	61.32	15.42
26	35.46	49.41	82.51	29.12	57.58	41.17	67.41	60.32	14.42
27	34.46	48.41	81.51	28.12	58.58	40.17	66.41	59.32	13.42
28	33.46	47.41	80.51	27.12	59.58	39.17	65.41	58.32	12.42
29	32.46	46.41	79.51	26.12	60.58	38.17	64.41	57.32	11.42
30	31.46	45.41	78.51	25.12	61.58	37.17	63.41	56.32	10.42
31	30.46	44.41	77.51	24.12	62.58	36.17	62.41	55.32	9.42
32	29.46	43.41	76.51	23.12	63.58	35.17	61.41	54.32	8.42
33	28.46	42.41	75.51	22.12	64.58	34.17	60.41	53.32	7.42
34	27.46	41.41	74.51	21.12	65.58	33.17	59.41	52.32	6.42
35	26.46	40.41	73.51	20.12	66.58	32.17	58.41	51.32	5.42
36	25.46	39.41	72.51	19.12	67.58	31.17	57.41	50.32	4.42
37	24.46	38.41	71.51	18.12	68.58	30.17	56.41	49.32	3.42
38	23.46	37.41	70.51	17.12	69.58	29.17	55.41	48.32	2.42
39	22.46	36.41	69.51	16.12	70.58	28.17	54.41	47.32	1.42
40	21.46	35.41	68.51	15.12	71.58	27.17	53.41	46.32	0.42
41	20.46	34.41	67.51	14.12	72.58	26.17	52.41	45.32	Below the Horizon.
42	19.46	33.41	66.51	13.12	73.58	25.17	51.41	44.32	
43	18.46	32.41	65.51	12.12	74.58	24.17	50.41	43.32	
44	17.46	31.41	64.51	11.12	75.58	23.17	49.41	42.32	
45	16.46	30.41	63.51	10.12	76.58	22.17	48.41	41.32	
46	15.46	29.41	62.51	9.12	77.58	21.17	47.41	40.32	
47	14.46	28.41	61.51	8.12	78.58	20.17	46.41	39.32	
48	13.46	27.41	60.51	7.12	79.58	19.17	45.41	38.32	
49	12.46	26.41	59.51	6.12	80.58	18.17	44.41	37.32	
50	11.46	25.41	58.51	5.12	81.58	17.17	43.41	36.32	
51	10.46	24.41	57.51	4.12	82.58	16.17	42.41	35.32	
52	9.46	23.41	56.51	3.12	83.58	15.17	41.41	34.32	
53	8.46	22.41	55.51	2.12	84.58	14.17	40.41	33.32	
54	7.46	21.41	54.51	1.12	85.58	13.17	39.41	32.32	
55	6.46	20.41	53.51	0.12	86.58	12.17	38.41	31.32	
56	5.46	19.41	52.51	Below the Horizon.	87.58	11.17	37.41	30.32	
57	4.46	18.41	51.51		88.58	10.17	36.41	29.32	
58	3.46	17.41	50.51		89.58 S	9.17	35.41	28.32	
59	2.46	16.41	49.51		89. 2 N	8.17	34.41	27.32	
60	1.46	15.41	48.51		88. 2	7.17	33.41	26.32	
Dec.	28°.14′N	14°.19′N	18°.51′S	34°.48′N	58°.2′S	22°.43′N	3°.41′S	3°.28′N	49°.18′N
Correction of one mile + or − Mer. Alt. for periods, as expressed below.									
	− in 3 yrs.	− in 3 yrs.	+ or − in 3 yrs.	− in 3 yrs.	+ or − in 3 yrs.	− in 3½ yrs.	+ or − in 4 yrs.	− in 4 yrs.	− in 5 yrs.

TABLE K.

TRUE MERIDIONAL ALTITUDES of STARS in SOUTH LATITUDE.—1844.

Lat.	Star N° 10.	Star N° 11.	Star N° 12.	Star N° 13	Star N° 14.	Star N° 15.	Star N° 16.	Star N° 17.	Star N° 18.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	73.49 N	44.10 N	81.37 S	61.32 N	82.38 N	37.23 S	73.30 S	57.47 N	84.23 N
1	72.49	43.10	82.37	60.32	81.38	38.23	74.30	56.47	83.23
2	71.49	42.10	83.37	59.32	80.38	39.23	75.30	55.47	82.23
3	70.49	41.10	84.37	58.32	79.38	40.23	76.30	54.47	81.23
4	69.49	40.10	85.37	57.32	78.38	41.23	77.30	53.47	80.23
5	68.49	39.10	86.37	56.32	77.38	42.23	78.30	52.47	79.23
6	67.49	38.10	87.37	55.32	76.38	43.23	79.30	51.47	78.23
7	66.49	37.10	88.37	54.32	75.38	44.23	80.30	50.47	77.23
8	65.49	36.10	89.37 S	53.32	74.38	45.23	81.30	49.47	76.23
9	64.49	35.10	89.23 N	52.32	73.38	46.23	82.30	48.47	75.23
10	63.49	34.10	88.23	51.32	72.38	47.23	83.30	47.47	74.23
11	62.49	33.10	87.23	50.32	71.38	48.23	84.30	46.47	73.23
12	61.49	32.10	86.23	49.32	70.38	49.23	85 30	45.47	72.23
13	60.49	31.10	85.23	48.32	69.38	50.23	86.30	44.47	71.23
14	59.49	30.10	84.23	47.32	68.38	51.23	87.30	43.47	70.23
15	58.49	29.10	83.23	46.32	67.38	52.23	88.30	42.47	69.23
16	57.49	28.10	82.23	45.32	66.38	53.23	89.30 S	41.47	68.23
17	56.49	27.10	81.23	44.32	65.38	54.23	89.30 N	40.47	67.23
18	55.49	26.10	80.23	43.32	64.38	55.23	88.30	39.47	66.23
19	54.49	25.10	79.23	42.32	63.38	56.23	87.30	38.47	65.23
20	53.49	24.10	78.23	41.32	62.38	57.23	86.30	37.47	64.23
21	52.49	23.10	77.23	40.32	61.38	58.23	85.30	36.47	63.23
22	51.49	22.10	76.23	39.32	60.38	59.23	84.30	35.47	62.23
23	50.49	21.10	75.23	38.32	59.38	60.23	83.30	34.47	61.23
24	49.49	20.10	74.23	37.32	58.38	61.23	82.30	33.47	60.23
25	48.49	19.10	73.23	36.32	57.38	62.23	81.30	32.47	59.23
26	47.49	18.10	72.23	35.32	56.38	63.23	80.30	31.47	58.23
27	46.49	17.10	71.23	34.32	55.38	64.23	79.30	30.47	57.23
28	45.49	16.10	70.23	33.32	54.38	65.23	78.30	29.47	56.23
29	44.49	15.10	69.23	32.32	53.38	66.23	77.30	28.47	55.23
30	43.49	14.10	68.23	31.32	52.38	67.23	76.30	27.47	54.23
31	42.49	13.10	67.23	30.32	51.38	68.23	75.30	26.47	53.23
32	41.49	12.10	66.23	29.32	50.38	69.23	74.30	25.47	52.23
33	40.49	11.10	65.23	28.32	49.38	70.23	73.30	24.47	51.23
34	39.49	10.10	64.23	27.32	48.38	71.23	72.30	23.47	50.23
35	38.49	9.10	63.23	26.32	47.38	72.23	71.30	22.47	49.23
36	37.49	8.10	62.23	25.32	46.38	73.23	70.30	21.47	48.23
37	36.49	7.10	61.23	24.32	45.38	74.23	69.30	20.47	47.23
38	35.49	6.10	60.23	23.32	44.38	75.23	68.30	19.47	46.23
39	34.49	5.10	59.23	22.32	43.38	76.23	67.30	18.47	45.23
40	33.49	4.10	58.23	21.32	42.38	77.23	66.30	17.47	44.23
41	32.49	3.10	57.23	20.32	41.38	78.23	65.30	16.47	43.23
42	31.49	2.10	56.23	19.32	40.38	79.23	64.30	15.47	42.23
43	30.49	1.10	55.23	18.32	39.38	80.23	63.30	14.47	41.23
44	29.49	0.10	54.23	17.32	38.38	81.23	62.30	13.47	40.23
45	28.49	Below the Horizon.	53.23	16.32	37.38	82.23	61.30	12.47	39.23
46	27.49		52.23	15.32	36.38	83.23	60.30	11.47	38.23
47	26.49		51.23	14.32	35.38	84.23	59.30	10.47	37.23
48	25.49		50.23	13.32	34.38	85.23	58.30	9.47	36.23
49	24.49		49.23	12.32	33.38	86.23	57.30	8.47	35.23
50	23.49		48.23	11.32	32.38	87.23	56.30	7.47	34.23
51	22.49		47.23	10.32	31.38	88.23	55.30	6.47	33.23
52	21.49		46.23	9.32	30.38	89.23 S	54.30	5.47	32.23
53	20.49		45.23	8.32	29.38	89.37 N	53.30	4.47	31.23
54	19.49		44.23	7.32	28.38	88.37	52.30	3.47	30.23
55	18.49		43.23	6.32	27.38	87.37	51.30	2.47	29.23
56	17.49		42.23	5.32	26.38	86.37	50.30	1.47	28.23
57	16.49		41.23	4.32	25.38	85.37	49.30	0.47	27.23
58	15.49		40.23	3.32	24.38	84.37	48.30	Below the Horizon.	26.23
59	14.49		39.23	2.32	23.38	83.37	47.30		25.23
60	13.49		38.23	1.32	22.38	82.37	46.30		24.23
Dec.	16°. 11′N	45°. 50′N	8°. 23′ S	28°. 28′N	7°. 22′ N	52°. 37′ S	16°. 30′ S	32°. 13′N	5°. 37′ N
	Correction of one mile + or − Mer. Alt. for periods, as expressed below.								
	− in 6 yrs.	− in 12 yrs.	+ or − in 13 yrs.	− in 16 yrs.	− in 44 yrs.	− or + in 36 yrs	− or + in 14 yrs.	+ in 8 yrs.	+ in 7 yrs.

TABLE K.

TRUE MERIDIONAL ALTITUDES of STARS in SOUTH LATITUDE.—1844.

Lat.	Star N° 19.	Star N° 20.	Star N° 21.	Star N° 22.	Star N° 23.	Star N° 24.	Star N° 25.	Star N° 26.	Star N° 27.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	61.36 N	20.55 S	82. 1 S	77.16 N	27.24 N	74.33 N	27.46 S	79.39 S	39.54 N
1	60.36	21.55	83. 1	76.16	26.24	73.33	28.46	80.39	38.54
2	59.36	22.55	84. 1	75.16	25.24	72.33	29.46	81.39	37.54
3	58.36	23.55	85. 1	74.16	24.24	71.33	30.46	82.39	36.54
4	57.36	24.55	86. 1	73.16	23.24	70.33	31.46	83.39	35.54
5	56.36	25.55	87. 1	72.16	22.24	69.33	32.46	84.39	34.54
6	55.36	26.55	88. 1	71.16	21.24	68.33	33.46	85.39	33.54
7	54.36	27.55	89. 1 S	70.16	20.24	67.33	34.46	86.39	32.54
8	53.36	28.55	89.59 N	69.16	19.24	66.33	35.46	87.39	31.54
9	52.36	29.55	88.59	68.16	18.24	65.33	36.46	88.39	30.54
10	51.36	30.55	87.59	67.16	17.24	64.33	37.46	89.39 S	29.54
11	50.36	31.55	86.59	66.16	16.24	63.33	38.46	89.21 N	28.54
12	49.36	32.55	85.59	65.16	15.24	62.33	39.46	88.21	27.54
13	48.36	33.55	84.59	64.16	14.24	61.33	40.46	87.21	26.54
14	47.36	34.55	83.59	63.16	13.24	60.33	41.46	86.21	25.54
15	46.36	35.55	82.59	62.16	12.24	59.33	42.46	85.21	24.54
16	45.36	36.55	81.59	61.16	11.24	58.33	43.46	84.21	23.54
17	44.36	37.55	80.59	60.76	10.24	57.33	44.46	83.21	22.54
18	43.36	38.55	79.59	59.16	9.24	56.33	45.46	82.21	21.54
19	42.36	39.55	78.59	58.16	8.24	55.33	46.46	81.21	20.54
20	41.36	40.55	77.59	57.16	7.24	54.33	47.46	80.21	19.54
21	40.36	41.55	76.59	56.16	6.24	53.33	48.46	79.21	18.54
22	39.36	42.55	75.59	55.16	5.24	52.33	49.46	78.21	17.54
23	38.36	43.55	74.59	54.16	4.24	51.33	50.46	77.21	16.54
24	37.36	44.55	73.59	53.16	3.24	50.33	51.46	76.21	15.54
25	36.36	45.55	72.59	52.16	2.24	49.33	52.46	75.21	14.54
26	35.36	46.55	71.59	51.19	1.24	48.33	53.46	74.21	13.54
27	34.36	47.55	70.59	50.16	0.24	47.33	54.46	73.21	12.54
28	33.36	48.55	69.59	49.16		46.33	55.46	72.21	11.54
29	32.36	49.55	68.59	48.16	Below	45.33	56.46	71.21	10.54
30	31.36	50.55	67.59	47.16	the	44.33	57.46	70.21	9.54
31	30.36	51.55	66.59	46.16	Horizon.	43.33	58.46	69.21	8.54
32	29.36	52.55	65.59	45.16		42.33	59.46	68.21	7.54
33	28.36	53.55	64.59	44.16		41.33	60.46	67.21	6.54
34	27.36	54.55	63.59	43.16		40.33	61.46	66.21	5.54
35	26.36	55.55	62.59	42.16		39.33	62.46	65.21	4.54
36	25.36	56.55	61.59	41.16		38.33	63.46	64.21	3.54
37	24.36	57.55	60.59	40.16		37.33	64.46	63.21	2.54
38	23.36	58.55	59.59	39.16		36.33	65.46	62.21	1.54
39	22.36	59.55	58.59	38.16		35.33	66.46	61.21	0.54
40	21.36	60.55	57.59	37.16		34.33	67.46	60.21	
41	20.36	61.55	56.59	36.16		33.33	68.46	59.21	Below
42	19.36	62.55	55.59	35.16		32.33	69.46	58.21	the
43	18.36	63.55	54.59	34.16		31.33	70.46	57.21	
44	17.36	64.55	53.59	33.16		30.33	71.46	56.21	Horizon.
45	16.36	65.55	52.59	32.16		29.33	72.46	55.21	
46	15.36	66.55	51.59	31.16		28.33	73.46	54.21	
47	14.36	67.55	50.59	30.16		27.33	74.46	53.21	
48	13.36	68.55	49.59	29.16		26.33	75.46	52.21	
49	12.36	69.55	48.59	28.16		25.33	76.46	51.21	
50	11.36	70.55	47.59	27.16		24.33	77.46	50.21	
51	10.36	71.55	46.59	26.16		23.33	78.46	49.21	
52	9.36	72.55	45.59	25.16		22.33	79.46	48.21	
53	8.36	73.55	44.59	24.16		21.33	80.46	47.21	
54	7.36	74.55	43.59	23.16		20.33	81.46	46.21	
55	6.36	75.55	42.59	22.16		19.33	82.46	45.21	
56	5.36	76.55	41.59	21.16		18.33	83.46	44.21	
57	4.36	77.55	40.59	20.16		17.33	84.46	43.21	
58	3.36	78.55	39.59	19.16		16.33	85.46	42.21	
59	2.36	79.55	38.59	18.16		15.33	86.46	41.21	
60	1.36	80.55	37.59	17.16		14.33	87.46	40.21	
Dec.	28°. 24′ N	69°. 5′ S	7°. 59′ S	12°. 44′ N	62°. 36′ N	15°. 27′ N	62°. 14′ S	10°. 21′ S	50°. 6′ N
Correction of one mile + or — Mer. Alt. for periods, as expressed below.									
	+ in 7½ yrs.	— in 4 yrs.	— or + in 4 yrs.	+ in 3½ yrs.	+ in 3 yrs.	+ in 3 yrs.	— in 3 yrs.	— or + in 3 yrs.	+ in 3 yrs.

TABLE K.

TRUE MERIDIONAL ALTITUDES of STARS in SOUTH LATITUDE.—1844.

Lat.	Star N° 28.	Star N° 29.	Star N° 30.	Star N° 31.	Star N° 32.	Star N° 33.	Star N° 34.	Star N° 35.	Star N° 36.
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0	30.23 S	70. 0 N	29.49 S	81.12 S	62.45 N	83. 5 N	63.55 S	75.26 N	77.19 N
1	31.23	69. 0	30.49	82.12	61.45	82. 5	64.55	74.26	76.19
2	32.23	68. 0	31.49	83.12	60.45	81. 5	65.55	73.26	75.19
3	33.23	67. 0	32.49	84.12	59.45	80. 5	66.55	72.26	74.19
4	34.23	66. 0	33.49	85.12	58.45	79. 5	67.55	71.26	73.19
5	35.23	65. 0	34.49	86.12	57.45	78. 5	68.55	70.26	72.19
6	36.23	64. 0	35.49	87.12	56.45	77. 5	69.55	69.26	71.19
7	37.23	63. 0	36.49	88.12	55.45	76. 5	70.55	68.26	70.19
8	38.23	62. 0	37.49	89.12 S	54.45	75. 5	71.55	67.26	69.19
9	39.23	61. 0	38.49	89.48 N	53.45	74. 5	72.55	66.26	68.19
10	40.23	60. 0	39.49	88.48	52.45	73. 5	73.55	65.26	67.19
11	41.23	59. 0	40.49	87.48	51.45	72. 5	74.55	64.26	66.19
12	42.23	58. 0	41.49	86.48	50.45	71. 5	75.55	63.26	65.19
13	43.23	57. 0	42.49	85.48	49.45	70. 5	76.55	62.26	64.19
14	44.23	56. 0	43.49	84.48	48.45	69. 5	77.55	61.26	63.19
15	45.23	55. 0	44.49	83.48	47.45	68. 5	78.55	60.26	62.19
16	46.23	54. 0	45.49	82.48	46.45	67. 5	79.55	59.26	61.19
17	47.23	53. 0	46.49	81.48	45.45	66. 5	80.55	58.26	60.19
18	48.23	52. 0	47.49	80.48	44.45	65. 5	81.55	57.26	59.19
19	49.23	51. 0	48.49	79.48	43.45	64. 5	82.55	56.26	58.19
20	50.23	50. 0	49.49	78.48	42.45	63. 5	83.55	55.26	57.19
21	51.23	49. 0	50.49	77.48	41.45	62. 5	84.55	54.26	56.19
22	52.23	48. 0	51.49	76.48	40.45	61. 5	85.55	53.26	55.19
23	53.23	47. 0	52.49	75.48	39.45	60. 5	86.55	52.26	54.19
24	54.23	46. 0	53.49	74.48	38.45	59. 5	87.55	51.26	53.19
25	55.23	45. 0	54.49	73.48	37.45	58. 5	88.55	50.26	52.19
26	56.23	44. 0	55.49	72.48	36.45	57. 5	89.55 S	49.26	51.19
27	57.23	43. 0	56.49	71.48	35.45	56. 5	69. 5 N	48.26	50.19
28	58.23	42. 0	57.49	70.48	34.45	55. 5	88. 5	47.26	49.19
29	59.23	41. 0	58.49	69.48	33.45	54. 5	87. 5	46.26	48.19
30	60.23	40. 0	59.49	68.48	32.45	53. 5	86. 5	45.26	47.19
31	61.23	39. 0	60.49	67.48	31.45	52. 5	85. 5	44.26	46.19
32	62.23	38. 0	61.49	66.48	30.45	51. 5	84. 5	43.26	45.19
33	63.23	37. 0	62.49	65.48	29.45	50. 5	83. 5	42.26	44.19
34	64.23	36. 0	63.49	64.48	28.45	49. 5	82. 5	41.26	43.19
35	65.23	35. 0	64.49	63.48	27.45	48. 5	81. 5	40.26	42.19
36	66.23	34. 9	65.49	62.48	26.45	47. 5	80. 5	39.26	41.19
37	67.23	33. 0	66.49	61.48	25.45	46. 5	79. 5	38.26	40.19
38	68.23	32. 0	67.49	60.48	24.45	45. 5	78. 5	37.26	39.19
39	69.23	31. 0	68.49	59.48	23.45	44. 5	77. 5	36.26	38.19
40	70.23	30. 0	69.49	58.48	22.45	43. 5	76. 5	35.26	37.19
41	71.23	29. 0	70.49	57.48	21.45	42. 5	75. 5	34.26	36.19
42	72.23	28. 0	71.49	56.48	20.45	41. 5	74. 5	33.26	35.19
43	73.23	27. 0	72.49	55.48	19.45	40. 5	73. 5	32.26	34.19
44	74.23	26. 0	73.49	54.48	18.45	39. 5	72. 5	31.26	33.19
45	75.23	25. 0	74.49	53.48	17.45	38. 5	71. 5	30.26	32.19
46	76.23	24. 0	75.49	52.48	16.45	37. 5	70. 5	29.26	31.19
47	77.23	23. 0	76.49	51.48	15.45	36. 5	69. 5	28.26	30.19
48	78.23	22. 0	77.49	50.48	14.45	35. 5	68. 5	27.26	29.19
49	79.23	21. 0	78.49	49.48	13.45	34. 5	67. 5	26.26	28.19
50	80.23	20. 0	79.49	48 48	12.45	33. 5	66. 5	25.26	27.19
51	81.23	19. 0	80.49	47.48	11.45	32. 5	65. 5	24.26	26.19
52	82.23	18. 0	81.49	46.48	10.45	31. 5	64. 5	23.26	25.19
53	83.23	17. 0	82.49	45.48	9.45	30. 5	63. 5	22.26	24.19
54	84.23	16. 0	83.49	44.48	8.45	29. 5	62. 5	21.26	23.19
55	85.23	15. 0	84.49	43.48	7.45	28. 5	61. 5	20.26	22.19
56	86.23	14. 0	85.49	42.48	6.45	27. 5	60. 5	19.26	21.19
57	87.23	13. 0	86.49	41.48	5.45	26. 5	59. 5	18.26	20.19
58	88.23	12. 0	87.49	40.48	4.45	25. 5	58. 5	17.26	19.19
59	89.23 S	11. 0	88.49	39.48	3.45	24. 5	57. 5	16.26	18.19
60	89.37 N	10. 0	89.49 S	38.48	2.45	23. 5	56. 5	15.26	17.19
Dec.	59°.37′ S	20°.0′ N	60°.11′ S	8°.48′ S	27°.15′ N	6°.55′ N	26°.5′ S	14°.34′ N	12°.41′ N
Correction of one mile + or — Mer Alt. for periods, as expressed below.									
	— or + in 3½ yrs.	+ in 3¾ yrs.	— in 3¾ yrs.	— or + in 4½ yrs.	+ in 4½ yrs.	+ in 5 yrs.	— or + in 7 yrs.	+ in 13 yrs.	+ in 19½ yrs.

TABLE K.

TRUE MERIDIONAL ALTITUDES of STARS in SOUTH LATITUDE.—1844.

Lat.	Star N° 37.	Star N° 38.	Star N° 39.	Star N° 40.	Star N° 41.	Star N° 42.	Star N° 43.	Star N° 44.
°	° '	° '	° '	° '	° '	° '	° '	° '
0	38.29 N	51.22 N	81.32 N	32.46 S	45.16 N	42.17 S	59.33 S	75.38 N
1	37.29	50.22	80.32	33.46	44.16	43.17	60.33	74.38
2	36.29	49.22	79.32	34.46	43.16	44.17	61.33	73.38
3	35.29	48.22	78.32	35.46	42.16	45.17	62.33	72.38
4	34.29	47.22	77.32	36.46	41.16	46.17	63.33	71.38
5	33.29	46.22	76.32	37.46	40.16	47.17	64.33	70.38
6	32.29	45.22	75.32	38.46	39.16	48.17	65.33	69.38
7	31.29	44.22	74.32	39.46	38.16	49.17	66.33	68.38
8	30.29	43.22	73.32	40.46	37.16	50.17	67.33	67.38
9	29.29	42.22	72.32	41.46	36.16	51.17	68.33	66.38
10	28.29	41.22	71.32	42.46	35.16	52.17	69.33	65.38
11	27.29	40.22	70.32	43.46	34.16	53.17	70.33	64.38
12	26.29	39.22	69.32	44.46	33.16	54.17	71.33	63.38
13	25.29	38.22	68.32	45.46	32.16	55.17	72.33	62.38
14	24.29	37.22	67.32	46.46	31.16	56.17	73.33	61.38
15	23.29	36.22	66.32	47.46	30.16	57.17	74.33	60.38
16	22.29	35.22	65.32	48.46	29.16	58.17	75.33	59.38
17	21.29	34.22	64.32	49.46	28.16	59.17	76.33	58.38
18	20.29	33.22	63.32	50.46	27.16	60.17	77.33	57.38
19	19.29	32.22	62.32	51.46	26.16	61.17	78.33	56.38
20	18.29	31.22	61.32	52.46	25.16	62.17	79.33	55.38
21	17.29	30.22	60.32	53.46	24.16	63.17	80.33	54.38
22	16.29	29.22	59.32	54.46	23.16	64.17	81.33	53.38
23	15.29	28.22	58.32	55.46	22.16	65.17	82.33	52.38
24	14.29	27.22	57.32	56.46	21.16	66.17	83.33	51.38
25	13.29	26.22	56.32	57.46	20.16	67.17	84.33	50.38
26	12.29	25.22	55.32	58.46	19.16	68.17	85.33	49.38
27	11.29	24.22	54.32	59.46	18.16	69.17	86.33	48.38
28	10.29	23.22	53.32	60.46	17.16	70.17	87.33	47.38
29	9.29	22.22	52.32	61.46	16.16	71.17	88.33	46.38
30	8.29	21.22	51.32	62.46	15.16	72.17	89.33 S	45.38
31	7.29	20.22	50.32	63.46	14.16	73.17	89.27 N	44.38
32	6.29	19.22	49.32	64.46	13.16	74.17	88.27	43.38
33	5.29	18.22	48.32	65.46	12.16	75.17	87.27	42.38
34	4.29	17.22	47.32	66.46	11.16	76.17	86.27	41.38
35	3.29	16.22	46.32	67.46	10.16	77.17	85.27	40.38
36	2.29	15.22	45.32	68.46	9.16	78.17	84.27	39.38
37	1.29	14.22	44.32	69.46	8.16	79.17	83.27	38.38
38	0.29	13.22	43.32	70.46	7.16	80.17	82.27	37.38
39		12.22	42.32	71.46	6.16	81.17	81.27	36.38
40	Below the Horizon.	11.22	41.32	72.46	5.16	82.17	80.27	35.38
41		10.22	40.32	73.46	4.16	83.17	79.27	34.38
42		9.22	39.32	74.46	3.16	84.17	78.27	33.38
43		8.22	38.32	75.46	2.16	85.17	77.27	32.38
44		7.22	37.32	76.46	1.16	86.17	76.27	31.38
45		6.22	36.32	77.46	0.16	87.17	75.27	30.38
46		5.22	35.32	78.46		88.17	74.27	29.38
47		4.22	34.32	79.46	Below the Horizon.	89.17 S	73.27	28.38
48		3.22	33.32	80.46		89.43 N	72.27	27.38
49		2.22	32.32	81.46		88.43	71.27	26.38
50		1.22	31.32	82.46		87.43	70.27	25.38
51		0.22	30.32	83.46		86.43	69.27	24.38
52			29.32	84.46		85.43	68.27	23.38
53		Below the Horizon.	28.32	85.46		84.43	67.27	22.38
54			27.32	86.46		83.43	66.27	21.38
55			26.32	87.46		82.43	65.27	20.38
56			25.32	88.46		81.43	64.27	19.38
57			24.32	89.46 S		80.43	63.27	18.38
58			23.32	89.14 N		79.43	62.27	17.38
59			22.32	88.14		78.43	61.27	16.38
60			21.32	87.14		77.43	60.27	15.38
Dec.	51°.31′ N	38°.38′ N	8°.28′ N	57°.14′ S	44°.44′ N	47°.43′ S	30°.27′ S	14°·22′ N
Correction of one mile + or — Mer. Alt. for periods, as expressed below.								
	+ in 85 yrs.	— in 20 yrs.	— in 6¾ yrs.	+ or — in 5½ yrs.	— in 4¾ yrs.	+ or — in 3½ yrs.	+ or — in 3¼ yrs.	— in 3¼ yrs.

TABLE L. — Shewing the earliest approximate APPARENT TIME when the Stars of the first magnitude may be observed in the EVENING TWILIGHT, throughout the Year; if subtracted from 24 hours, the remainder is the latest APPARENT TIME to observe them, in the MORNING.

The Sun's Declination of the same name as the Latitude.

Lat.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	Lat.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	
0°	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	0°
5	6.19	6.19	6.19	6.20	6.20	6.21	6.21	6.21	6.22	6.22	6.23	6.23	6.23	5
10	6.19	6.20	6.20	6.21	6.22	6.23	6.23	6.24	6.25	6.26	6.26	6.27	6.28	10
15	6.19	6.20	6.21	6.23	6.24	6.25	6.26	6.27	6.28	6.29	6.31	6.32	6.33	15
20	6.20	6.21	6.23	6.24	6.26	6.27	6.29	6.30	6.32	6.33	6.35	6.37	6.38	20
25	6.21	6.22	6.24	6.26	6.28	6.30	6.32	6.34	6.36	6.38	6.40	6.42	6.44	25
30	6.22	6.24	6.26	6.29	6.31	6.33	6.36	6.38	6.41	6.43	6.45	6.48	6.51	30
35	6.23	6.26	6.28	6.31	6.34	6.37	6.40	6.43	6.46	6.49	6.52	6.55	6.58	35
40	6.24	6.28	6.31	6.35	6.38	6.41	6.45	6.48	6.52	6.56	6.59	7. 3	7. 7	40
45	6.26	6.30	6.35	6.39	6.43	6.47	6.51	6.55	7. 0	7. 4	7. 8	7.13	7.17	45
50	6.29	6.34	6.39	6.44	6.49	6.53	6.59	7. 4	7. 9	7.14	7.19	7.25	7.30	50
55	6.33	6.38	6.44	6.50	6.56	7. 2	7. 8	7.14	7.20	7.27	7.33	7.40	7.47	55
60	6.37	6.45	6.52	6.58	7. 6	7.13	7.21	7.28	7.36	7.44	7.52	8. 1	8. 9	60

Lat.	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°		Lat.
0°	6.19	6.19	6.19	6.19	6.20	6.20	6.20	6.20	6.20	6.20	6.20	6.20	...	0°
5	6.24	6.24	6.25	6.25	6.26	6.26	6.27	6.27	6.28	6.28	6.29	6.30	...	5
10	6.29	6.30	6.31	6.31	6.32	6.33	6.34	6.35	6.36	6.37	6.38	6.39	..	10
15	6.34	6.35	6.37	6.38	6.39	6.40	6.42	6.43	6.45	6.46	6.47	6.49	...	15
20	6.40	6.42	6.43	6.45	6.47	6.48	6.50	6.52	6.54	6.56	6.58	6.59	...	20
25	6.46	6.48	6.50	6.52	6.55	6.57	6.59	7. 2	7. 4	7. 6	7. 9	7.11	...	25
30	6.53	6.56	6.58	7. 1	7. 4	7. 7	7. 9	7.12	7.15	7.18	7.21	7.24	...	30
35	7. 1	7. 4	7. 8	7.11	7.14	7.18	7.21	7.25	7.28	7.32	7.36	7.39	...	35
40	7.10	7.14	7.18	7.22	7.26	7.30	7.35	7.39	7.43	7.48	7.53	7.57	...	40
45	7.22	7.26	7.31	7.36	7.41	7.46	7.51	7.56	8. 2	8. 8	8.13	8.19	...	45
50	7.36	7.41	7.47	7.53	7.59	8. 5	8.12	8.19	8.25	8.33	8.40	8.48	...	50
55	7.54	8. 1	8. 8	8.15	8.23	8.31	8.40	8.49	8.58	9. 8	9.18	9.29	...	55
60	8.18	8.27	8.37	8.47	8.58	9. 9	9.21	9.34	9.48	10. 4	10.23	10.47	...	60

The Sun's Declination of a contrary name to the Latitude.

Lat.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	Lat.
0°	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	0°
5	6.19	6.18	6.18	6.18	6.17	6.17	6.17	6.16	6.16	6.16	6.15	6.15	6.14	5
10	6.19	6.18	6.17	6.17	6.16	6.15	6.15	6.14	6.13	6.13	6.12	6.11	6.10	10
15	6.19	6.18	6.17	6.16	6.15	6.14	6.13	6.12	6.11	6.10	6. 9	6. 8	6. 6	15
20	6.20	6.18	6.17	6.16	6.14	6.13	6.11	6.10	6. 8	6. 7	6. 5	6. 4	6. 2	20
25	6.21	6.19	6.17	6.15	6.13	6.11	6. 9	6. 8	6. 6	6. 4	6. 2	6. 0	5.58	25
30	6.22	6.19	6.17	6.15	6.12	6.10	6. 8	6. 5	6. 3	6. 1	5.59	5.56	5.53	30
35	6.23	6.20	6.17	6.14	6.12	6. 9	6. 6	6. 3	6. 0	5.58	5.55	5.52	5.49	35
40	6.24	6.21	6.18	6.14	6.11	6. 8	6. 4	6. 1	5.58	5.54	5.51	5.47	5.44	40
45	6.26	6.22	6.18	6.14	6.10	6. 6	6. 2	5.58	5.54	5.51	5.46	5.42	5.38	45
50	6.29	6.24	6.19	6.15	6.10	6. 5	6. 0	5.56	5.51	5.46	5.41	5.36	5.31	50
55	6.33	6.27	6.21	6.15	6.10	6. 4	5.58	5.53	5.47	5.41	5.35	5.29	5.23	55
60	6.37	6.30	6.24	6.17	6.10	6. 3	5.56	5.49	5.42	5.35	5.28	5.21	5.13	60

Lat.	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°		Lat.
0°	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.20	6.20	6.20	6.20	...	0°
5	6.14	6.14	6.14	6.13	6.13	6.13	6.12	6.12	6.12	6.12	6.11	6.11	...	5
10	6.10	6. 9	6. 8	6. 8	6. 7	6. 6	6. 6	6. 5	6. 4	6. 4	6. 3	6. 2	...	10
15	6. 5	6. 4	6. 3	6. 2	6. 1	6. 0	5.59	5.58	5.57	5.56	5.54	5.53	...	15
20	6. 1	5.59	5.58	5.56	5.55	5.53	5.52	5.50	5.49	5.47	5.46	5.44	...	20
25	5.56	5.54	5.52	5.50	5.48	5.46	5.45	5.43	5.41	5.39	5.37	5.34	...	25
30	5.51	5.49	5.46	5.44	5.42	5.39	5.37	5.34	5.32	5.29	5.27	5.24	...	30
35	5.46	5.43	5.40	5.37	5.34	5.31	5.28	5.25	5.22	5.19	5.16	5.13	...	35
40	5.40	5.37	5.33	5.30	5.26	5.23	5.19	5.15	5.11	5. 8	5. 4	5. 0	...	40
45	5.34	5.30	5.25	5.21	5.17	5.13	5. 8	5. 4	4.59	4.55	4.50	4.45	...	45
50	5.26	5.21	5.16	5.11	5. 6	5. 1	4.55	4.50	4.44	4.39	4.33	4.27	...	50
55	5.17	5.11	5. 5	4.59	4.53	4.46	4.40	4.33	4.26	4.19	4.12	4. 5	...	55
60	5. 6	4.58	4.51	4.43	4.35	4.27	4.19	4.11	4. 2	3.53	3.44	3.34	...	60

TABLE M.—Approximate Situations of convenient Stars for observing in the British Channel, or parallel of 49°. 30′. N., during Twilight throughout the Year.—Adapted to Mean Time.

Month.	Day.	Latest Time Stars are observable in the Morning.	Earliest Time Stars are observable in the Evening.	Convenient Stars for finding the Time.						For finding the Latitude.			
				Morning Twilight.			Evening Twilight.			Stars on or near Meridian.			
				No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Morning.	No. of Star.	Evening.
		h m	h m		° ′			° ′					
Jan.	1	19.29	4.39	38	44. 0	E by S	10	21. 0	ESE ¼ S	29	South.	..	....
	..	.....	....	22	27.30	W b N ¼ N	38	37.30	NW ¼ W	..	....	..	....
	5	19.28	4.42	38	47. 0	E by S ¼ S	10	24. 0	ESE ½ S	29	South.	1	South.
	..	.....	....	22	24.30	W b N ½ N	38	34. 0	NW	..	....	..	....
	9	19.27	4.47	38	49. 0	E by S ½ S	10	28.30	SE by E	29	South.	2	South
	..	.... .	....	22	22. 0	W b N ¾ N	38	32. 0	NW ½ N	..	....	..	....
	13	19.26	4.52	38	51.30	E by S ¾ S	10	31.30	SE ¾ E	31	South.	3	South.
	..	.....	....	22	20. 0	WNW	39	19. 0	W b N ½ N	..	....	..	....
	17	19.23	4.57	38	53.30	ESE	10	34. 0	SE ¼ E	31	South.	3	South.
	..	.....	....	22	18. 0	WNW ¼ N	39	15.30	W b N ¾ N	..	....	..	....
	21	19.20	5. 2	38	56. 0	ESE ¼ S	10	37. 0	SE b S	31	South.	3	South.
	..	.....	....	22	16. 0	WNW ½ N	39	12.30	WNW ¼ N	..	....	..	....
	25	19.17	5. 9	38	58. 0	ESE ½ S	11	55.30	E ¾ S	32	South.	4	South.
	..	.....	....	22	14. 0	WNW ½ N	38	20. 0	NNW ¾ W	..	....	..	N.
	29	19.11	5.15	38	60.30	ESE ¾ S	17	30. 0	E ¾ S	33	South.	27	unr.
	..	.....	....	24	30. 0	W b N ¼ N	38	16.30	NNW ¼ W	..	....	..	Pole.
Feb.	2	19. 7	5.21	38	61.30	ESE ¾ S	11	61.30	E by S ¼ S	33	South.	6	South.
	..	.....	....	24	28. 0	W b N ½ N	38	15. 0	NNW ¼ W	..	....	..	....
	6	19. 0	5.28	38	61. 0	SE by E	17	35.30	E by S ¼ S	33	South.	8	South
	..	.....	....	24	27.30	W b N ½ N	1	55. 0	W ¾ N	..	....	..	....
	10	18.55	5.35	38	64.30	SE ¾ E	17	39. 0	E by S ¾ S	34	South.	8	South.
	..	.....	....	24	25. 0	W b N ¾ N	1	50. 0	W b N	..	....	..	....
	14	18.48	5.42	39	32.30	SE ¾ S	17	44. 0	ESE	34	South.	..	....
	..	.....	....	24	23. 0	WNW	2	37. 0	West.	..	....	..	....
	18	18.41	5.47	39	34. 0	SE by S	17	47. 0	ESE ½ S	34	South.	..	....
	..	.....	....	24	22. 0	WNW ¼ N	2	33.30	W ½ N	..	....	..	....
	22	18.34	5.54	39	35. 0	SSE ¾ E	17	51. 0	ESE ¾ S	34	South.	10	South.
	..	.....	....	24	21. 0	WNW ¼ N	2	30.30	W by N	..	....	..	....
	26	18.26	6. 0	39	36. 0	SSE ½ E	17	54. 0	SE by E	..	....	10	South.
	..	.....	....	24	20. 0	WNW ½ N	2	27. 0	W b N ¾ N	..	....	..	....
Mar.	2	18.17	6. 7	41	55. 0	E by S	22	18. 0	ESE ¼ S	35	South.	11	South.
	..	.....	....	29	45.30	W ¾ S	2	23. 0	WNW ¼ W	..	....	..	....
	6	18. 9	6.13	41	56.30	E ¾ S	22	22. 0	ESE ¾ S	35	South.	13	South.
	..	.....	....	29	44. 0	W ¼ N	2	19. 0	WNW ¼ N	..	....	..	....
	10	18. 1	6.19	41	57. 0	E by S ¼ S	22	25. 0	SE ¾ E	35	South.	14	South.
	..	.....	....	29	42.30	W ½ N	2	15.30	WNW ½ N	..	....	..	....
	14	17.52	6.22	41	58. 0	E by S ½ S	22	29. 0	SE ½ E	35	South.	16	South.
	..	.....	....	29	41.30	W ½ N	10	52. 0	WSW ½ S	..	....	..	....
	18	17.44	6.32	41	59. 0	E by S ¾ S	24	17.30	E by S ¾ S	36	South.	16	South.
	..	.....	....	29	40.30	W ¾ N	10	49. 0	W by S ¾ S	..	....	..	....
	22	17.36	6.38	1	17. 0	E ½ S	24	21. 0	ESE ¼ S	36	South	16	South
	..	.....	....	29	39. 0	W by N	10	46.30	W by S	..	....	..	....
	26	17.28	6.44	1	19. 0	E ½ S	24	25.30	ESE ¾ S	36	South.	17	South.
	..	.....	....	29	38. 0	W by N	13	43. 0	W ½ S	..	....	..	....
	30	17.18	6.50	1	20.30	E ½ S	24	29.30	SE ¾ E	37	North.	17	South.
	..	.....	....	29	37. 0	W b N ¼ N	10	40. 0	West.	..	....	18	South.
Apr.	3	17.10	6.56	1	22.30	E ¾ S	24	32. 0	SE ½ E	37	North	18	South.
	..	.....	....	29	36. 0	W b N ¼ N	10	37. 0	W ½ N	..	....	..	....
	7	17. 2	7. 2	1	24. 0	E ¾ S	24	35.30	SE	37	North.	..	....
	..	.....	....	29	34.30	W b N ½ N	10	34.30	W ¾ N	..	....	..	....
	11	16.53	7. 9	1	25. 0	E by S	24	39. 0	SE ½ S	37	North	..	....
	..	.....	....	29	33.30	W b N ½ N	10	31. 0	W by N	..	....	..	....
	15	16.44	7.16	1	26. 0	E by S	29	22. 0	E by S ¾ S	37	North.	..	....
	..	.....	....	29	32. 0	W b N ¾ N	10	27.30	W b N ½ N	..	....	..	....
	19	16.35	7.23	1	27. 0	E by S ¼ S	29	26. 0	ESE	38	South.	21	South.
	..	.....	....	29	31.30	W b N ¾ N	10	23.30	WNW	..	....	..	....
	23	16.26	7.30	1	28. 0	E by S ¼ S	29	29.30	ESE ½ S	38	South.	22	South.
	..	.....	....	29	30. 0	W b N ¾ N	10	20. 0	WNW ¼ W	..	....	..	....
	27	16.19	7.35	1	29. 0	E by S ½ S	29	33. 0	SE by E	38	South	22	South.
	..	.....	....	29	28.30	WNW	10	17. 0	WNW ¾ N	..	....	..	....
May	1	16.12	7.42	1	30. 0	E by S ½ S	29	36.30	SE ¾ E	38	South.	23	North.
	..	.....	....	29	27.30	WNW ¼ N	17	52. 0	W b N ¾ N	..	....	..	....

TABLE M.—Approximate Situations of convenient Stars for observing in the British Channel, or parallel of 49°. 30′ N., during Twilight throughout the Year.—Adapted to Mean Time.

Month.	Day.	Latest Time Stars are observable in the Morning.	Earliest Time Stars are observable in the Evening.	Convenient Stars for finding the Time.						For finding the Latitude.			
				Morning Twilight.			Evening Twilight.			Stars on or near Meridian.			
				No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Morning.	No. of Star.	Evening.
		h m	h m		° ′			° ′					
May	5	16. 5	7.49	2	20. 0	ESE ½ S	29	40. 0	SE ¼ E	38	South.	23	North
	..	.....	....	29	26. 0	WNW ½ N	17	48. 0	W b N ¾ N	..	....	..	....
	9	15.57	7.55	2	21. 0	ESE ½ S	29	44. 0	SE ¼ S	38	South.	..	....
	..	.....	....	29	24.30	WNW ½ N	17	44.30	WNW	..	....	..	....
	13	15.51	8. 1	2	23.30	ESE ¾ S	29	46.30	SE ¾ S	38	South.	24	South.
	..	.....	....	29	23. 0	WNW ¾ N	17	41.30	WNW	..	....	..	....
	17	15.45	8. 7	2	24.30	SE by E	29	49. 0	SSE ¾ E	39	South.	24	South.
	..	.....	....	29	21.30	WNW ¾ W	17	38. 0	WNW	..	....	..	....
	21	15.39	8.13	2	26. 0	SE by E	29	52. 0	SSE ¼ E	39	South.	..	....
	..	.....	....	29	20. 0	NW by W	17	35. 0	NW by W	..	....	..	....
	25	15.35	8.19	2	29. 0	SE ½ E	38	28. 0	E ¼ N	39	South.	..	....
	..	.....	....	29	18. 0	NW by W	17	31. 0	NW ½ W	..	....	..	....
	29	15.31	8.23	2	30.30	SE ½ E	38	32.30	East	39	South.	26	South.
	..	.....	....	29	16. 0	NW ½ W	17	28. 0	NW ¼ W	..	....	..	....
June	2	15.27	8.29	2	31.30	SE ¾ E	38	36. 0	E ¾ S	39	South.	26	South.
	..	.....	....	29	14.30	NW ½ W	17	25. 0	NW ½ N	..	....	..	....
	6	15.24	8.32	2	33.30	SE	38	38.30	E ½ S	..	....	27	North.
	..	.....	....	29	12.30	NW ¼ W	17	22. 0	NW ¾ N	..	....	..	....
	10	15.22	8.36	2	35.30	SE ¼ S	38	41.30	E ¾ S	41	South.	29	South.
	..	.....	....	38	63.30	W by N	22	31. 0	W ½ N	..	....	..	....
	14	15.21	8.39	2	37.30	SE ½ S	38	45.30	E by S	41	South.	29	South.
	..	.....	....	38	62. 0	W b N ¾ N	22	27.30	W b N ¾ N	..	....	..	....
	18	15.20	8.42	2	39.30	SE ¾ S	38	47.30	E by S ¼ S	..	....	30	South.
	..	.....	....	38	59. 0	W b N ¾ N	22	24. 0	W b N ½ N	..	....	..	....
	22	15.21	8.43	2	43.30	SE by S	38	51. 0	E by S ½ S	..	....	31	South.
	..	.....	....	38	56.30	WNW	22	21. 0	W b N ¾ N	..	....	..	....
	26	15.22	8.44	11	23. 0	ENE ¾ E	38	53. 0	E by S ¾ S	..	....	31	South.
	..	.....	....	38	54. 0	WNW ¾ N	22	19. 0	WNW	..	....	..	....
	30	15.24	8.42	11	24.30	ENE ¾ N	38	56. 0	ESE	42	South.	32	South.
	..	.. ..	....	38	57.30	WNW ½ N	24	34.30	West	..	....	..	....
July	4	15.27	8.41	11	27.30	E by N ¾ N	38	58. 0	ESE ½ S	42	South.	33	South.
	..	.....	....	38	49. 0	WNW ¾ N	24	32. 0	W by N	..	....	..	....
	8	15.31	8.39	11	29.30	E by N	38	60. 0	ESE ½ S	..	....	34	South.
	..	.....	....	38	45.30	NW by W	24	30. 0	W b N ¾ N	..	....	..	....
	12	15.37	8.36	10	18. 0	ESE	38	62.30	ESE ¾ S	43	South.	34	South.
	..	.....	....	38	41.30	NW ½ W	24	27.30	W b N ½ N	..	....	..	....
	16	15.40	8.32	10	21.30	ESE ¾ S	38	64.30	SE by E	44	South.	34	South.
	..	.....	....	38	38.30	NW ¼ W	24	26. 0	W b N ½ N	..	....	..	....
	20	15.44	8.28	10	24.30	ESE ¾ S	38	65.30	SE ¾ E	..	....	34	South.
	..	.....	....	38	35.30	NW	24	24. 0	W b N ¾ N	..	....	..	....
	24	15.50	8.22	10	27.30	SE by E	39	33.30	SE by S	1	South.	35	South.
	..	.....	....	38	32. 0	NW ¾ N	24	22. 0	W b N ¾ N	..	....	..	....
	28	15.56	8.16	10	31. 0	SE ¾ E	39	35. 0	SSE ¾ E	2	South.	35	South.
	..	.....	....	38	29. 0	NW ½ N	24	21. 0	WNW ¾ N	..	....	..	....
Aug.	1	16. 2	8.10	10	34.30	SE ¾ E	39	36. 0	SSE ½ E	3	South.	35	South.
	..	.....	....	38	26. 0	N b W ¾ W	24	19. 0	WNW ½ N	..	....	..	....
	5	16. 9	8. 3	10	38. 0	SE ¾ S	39	37.30	ESE ½ E	4	South.	35	South.
	..	.....	....	38	22.30	NNW ¾ W	29	44.30	West	..	....	..	....
	9	16.15	7.55	11	55. 0	E ¾ S	39	38.30	SSE ¾ E	5	South.	36	South.
	..	.....	....	38	19.30	NNW ½ W	29	43.30	W ¼ N	..	....	..	....
	13	16.21	7.49	11	58.30	E by S	39	39.30	SSE	5	South.	36	South.
	..	.....	....	38	16. 0	NNW ¾ W	29	42. 0	W ½ N	6	South.	36	South.
	17	16.27	7.41	17	32.30	E by S	39	40.30	S by E ¾ E	7	South.	..	....
	..	.....	....	38	14. 0	NNW	29	41. 0	W ½ N	..	....	..	....
	21	16.32	7.34	14	31.30	SE ¾ S	39	41.30	S by E ½ E	7	South.	37	North.
	..	.....	....	1	53.30	W ¾ N	29	39.30	W ¾ N	..	....	..	....
	25	16.38	7.26	14	34.30	SSE ½ E	39	42.30	S by E ¾ E	8	South.	37	North.
	..	.....	....	1	50. 0	W ½ N	29	38. 0	W by N	..	....	..	....
	29	16.45	7.15	17	43. 0	ESE	41	62.30	E by S ½ S	10	South.	37	North.
	..	.....	....	1	46. 0	W b N ¾ N	29	37. 0	W b N ¾ N	..	....	..	....
Sep.	2	16.51	7. 7	17	46.30	ESE ¾ S	41	65. 0	ESE ¾ S	10	South.	37	North
	..	.....	....	1	42.30	W b N ¾ N	29	36. 0	W b N ¾ N	..	....	..	....

TABLE M.—Approximate Situations of convenient Stars for observing in the British Channel, or parallel of 49°. 30′ N., during Twilight throughout the Year.—Adapted to Mean Time.

Month.	Day.	Latest Time Stars are observable in the Morning.	Earliest Time Stars are observable in the Evening.	Convenient Stars for finding the Time.						For finding the Latitude.			
				Morning Twilight.			Evening Twilight.			Stars on or near Meridian.			
				No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Altitude.	Compass Bearing.	No. of Star.	Morning.	No. of Star.	Evening.
		h m	h m		° ′			° ′					
Sep.	6	16.56	7. 0	17	50.30	ESE ¾ S	1	23. 0	E ¾ S	..	....	38	South.
	..	.....	....	1	39. 0	WNW ¼ N	29	35. 0	W b N ¼ N	..	....	..	....
	10	17. 4	6.50	17	53.30	SE by E	1	23.30	E ¾ S	10	South.	38	South.
	..	.....	....	1	35. 0	WNW ¼ N	29	34. 0	W b N ½ N	..	....	..	....
	14	17.10	6.40	17	57. 0	SE by E	1	24.30	E ¾ S	10	South.	38	South.
	..	.....	....	1	34. 0	WNW ¼ N	29	33. 0	W b N ½ N	..	....	..	....
	18	17.16	6.32	17	61. 0	SE ¼ S	1	25. 0	E ¾ S	11	South.	38	South
	..	.....	....	1	27.30	NW ¾ W	29	32. 0	W b N ¾ N	..	....	..	....
	22	17.23	6.23	17	63.30	SE ½ S	1	26.30	E by S	13	South.	38	South.
	..	.....	....	1	25. 0	NW ¼ W	29	30.30	W b N ¾ N	..	....	..	....
	26	17.27	6.15	22	28. 0	SE ½ E	1	31.30	E by S ¼ S	14	South.	..	....
	..	.....	....	10	52.30	WSW ½ S	29	29. 0	WNW	..	....	..	....
	30	17.34	6. 6	22	31. 0	SE ¼ E	1	32. 0	E by S ½ S	14	South.	..	....
	..	.....	....	10	50. 0	WSW	29	28. 0	WNW ¼ N	..	....	..	....
Oct.	4	17.41	5.59	22	35. 0	SE	1	34.30	E by S ¾ S	16	South	..	....
	..	.....	....	10	47.30	W by S ¼ S	29	27. 0	WNW ¼ N	..	....	..	....
	8	17.46	5.50	24	24. 0	ESE ½ S	1	36. 0	ESE ¼ S	16	South.	..	....
	..	.....	....	10	45. 0	W ¾ S	29	26. 0	WNW ½ N	..	....	..	....
	12	17.51	5.41	24	28. 0	SE b E ½ S	1	37. 0	ESE ¼ S	17	South.	..	....
	..	.....	....	10	42. 0	W ½ S	29	25. 0	WNW ½ N	..	....	..	....
	16	17.58	5.34	24	31.30	SE ¾ E	1	40. 0	ESE ¼ S	19	South.	39	South.
	..	.....	....	10	38.30	W ¼ N	29	23.30	WNW ½ N	..	....	..	....
	20	18. 4	5.26	24	34. 0	SE ¼ E	1	35 30	ESE ¾ S	19	South.	39	South.
	..	.....	....	10	35. 0	W ¾ N	29	22.30	WNW ¾ N	..	....	..	....
	24	18.11	5.17	24	38. 0	SE ¼ S	1	37. 0	ESE ¼ S	..	....	39	South.
	..	.....	....	10	32. 0	W by N	29	20.30	WNW ¾ N	..	....	..	....
	28	18.17	5.11	24	41. 0	SE ¾ S	1	38. 0	ESE ½ S	..	....	39	South.
	..	.....	....	10	28. 0	W b N ½ N	29	19. 0	NW by W	..	....	..	....
Nov.	1	18.24	5. 4	29	25. 0	ESE	1	40. 0	ESE ½ S	..	....	..	....
	..	.. ..	....	10	24.30	W b N ¾ N	29	18. 0	NW by W	..	....	..	....
	5	18.30	4.58	29	29. 0	ESE ½ S	1	41.30	ESE ¾ S	21	South.	..	....
	..	.....	....	10	21. 0	WNW ¼ N	29	16. 0	NW ¾ W	..	....	..	....
	9	18.36	4.52	29	32. 0	ESE ¾ S	4	37, 0	E by S	22	South.	..	....
	..	.....	....	10	17.30	WNW ½ N	29	15. 0	NW ½ W	..	....	..	....
	13	18.43	4.47	29	36. 0	SE b E ¼ S	4	38. 0	E by S ¼ S	22	South.	41	South.
	..	.....	....	10	11. 0	NW ¼ W	29	13. 0	NW ¼ W	..	....	..	....
	17	18.49	4.41	29	39. 0	SE ¼ E	4	40.30	E by S ¼ S	..	....	41	South
	..	.....	....	17	49.30	W b N ¼ N	38	65.30	W ¾ N	..	....	..	....
	21	18.55	4.37	29	43. 0	SE	4	41. 0	E by S ½ S	23	North.	..	....
	..	.....	....	17	46.30	W b N ¾ N	38	64.30	W by N	..	....	..	....
	25	19. 0	4.34	29	46. 0	SE ¾ S	4	44. 0	E by S ¾ S	23	North.	..	....
	..	.....	....	17	43.30	WNW ¼ N	38	62. 0	W b N ½ N	..	....	..	....
	29	19. 6	4.32	29	49. 0	SSE ¾ E	4	45.30	E by S ¾ S	24	South.	..	....
	..	.....	....	17	39.30	WNW ½ N	38	60. 0	W b N ½ N	..	....	..	....
Dec.	3	19.10	4.30	38	24.30	E ¾ N	4	48. 0	ESE	24	South.	..	....
	..	.....	....	17	37. 0	NW by W	38	57.30	W b N ¾ N	..	....	..	....
	7	19.15	4.29	38	27. 0	E ½ N	4	51. 0	ESE ¼ S	..	....	..	....
	..	.....	....	17	34. 0	NW ¾ W	38	55.30	WNW	..	....	..	....
	11	19.19	4.29	38	30.30	East	4	53.30	ESE ¾ S	..	....	..	....
	..	.....	....	17	30. 0	NW ½ W	38	52.30	WNW ½ N	..	....	..	....
	15	19.23	4.29	38	33. 0	E ¼ S	4	56. 0	ESE ¾ S	..	....	..	....
	..	.....	....	17	27. 0	NW ¼ W	38	50. 0	WNW ½ N	..	....	..	....
	19	19.26	4.30	38	36. 0	E ¼ S	4	58. 0	SE ¾ E	26	South.	43	South.
	..	.....	....	17	25. 0	NW	38	48. 0	WNW ¾ N	..	....	..	....
	23	19.28	4.32	38	38.30	E ½ S	10	15. 0	E by S ½ S	26	South.	43	South.
	..	.....	....	17	22. 0	NW ½ N	38	45. 0	NW ¾ W	..	....	..	....
	27	19.30	4.34	38	41. 0	E ¾ S	10	17.30	E by S ¾ S	29	South.	44	South.
	..	.....	....	22	29. 0	W ¾ N	38	42.30	NW ½ W	29	South.	..	....
	31	19.28	4.38	38	44. 0	E by S	10	20.30	ESE ¼ S	29	South.	..	....
	..	.....	....	22	27. 0	W by N	38	38.30	NW ¼ W	29	South.	..	....

TABLE N.

Rough Situations of the Stars, when certain ones are on the Meridian, in 49°. 30′ N. Lat., being the parallel of the British Channel.

Star, No. 2, *Algenib*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 54°. 42′ S.
The other Stars that are above the Horizon will be, viz.:—

No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.
		°			°			°
1	S 1 W	69	11	ENE ½ N	14	35	W by N ½ N	2
3	S ¾ E	21	12	E by S ½ S	2	36	W by N ¼ N	4
4	SE by S	72	13	E by N	28	37	NW ½ W	36
6	SE ¼ E	55	14	East	8	38	WNW ½ N	33
7	SE ¼ S	30	17	NE ¾ E	13	39	W by S ¼ S	22
8	SE ½ E	31	19	NE by E	7	41	W by N ¼ N	55
9	E by N ½ N	60	23	N ¾ E	23	43	S by W ½ W	8
10	E ¾ S	29	27	N by W ½ W	13	44	SSW ½ W	52

Star, No. 6, *Arietis*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 63°. 7′ S.
The other Stars that are above the Horizon will be, viz.:—

1	WSW ¾ S	59	11	E by N ¼ N	58	23	NNE	28
2	SW ¼ S	48	12	SE ½ E	19	27	N ¼ E	9
3	SSW	19	13	E by S	48	37	NW by N	23
4	SW	72	14	ESE	25	38	NW ¼ W	16
7	S ½ E	36	16	ESE ¼ S	Rising	39	W ¾ N	4
8	S by E ½ E	42	17	E by N ½ N	27	41	WNW ½ N	37
9	E ¾ N	77	18	East	8	44	WSW ½ S	39
10	SE by E	45	19	E by N ½ N	25			

Star, No. 9, *a Persei*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 89°. 48′ S.
The other Stars that are above the Horizon will be, viz.:—

1	W by S ½ S	48	11	East	71	22	E by N ½ N	3
2	WSW ¼ S	38	12	SSE ¾ E	27	23	NNE ½ E	33
3	SW ½ S	13	13	ESE ½ S	56	27	N by E ¼ E	13
4	W by S	62	14	SE ¼ E	38	37	NNW ¾ W	17
7	S by W ½ W	40	16	SE ½ E	11	38	NW ½ N	7
8	S ½ W	41	17	E ¾ N	41	41	NW ¾ W	26
9	Meridian	Zen.	18	E by S ½ S	21	44	W ¾ S	27
10	SE by S	54	19	E ½ N	37			

Star, No. 10, *Aldebaran*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 56°. 39′ S.
The other Stars that are above the Horizon will be, viz.:—

1	W ½ N	35	11	ESE ½ S	83	22	E ¾ N	12
2	W by S	26	12	S by E	31	23	NE by N	41
3	SW ¾ W	4	13	SSE ½ E	68	24	ENE ¼ N	Hori.
4	W ¼ S	49	14	SSE	46	27	ENE ½ E	17
6	WSW ¾ S	49	16	SSE ¾ E	19	37	N by W ¼ W	12
7	SW ¾ S	32	17	E by S	54	38	NNW	2
8	SSW ½ W	40	18	SE by E	33	41	NW ½ N	18
9	W ¼ N	77	19	E by S	49	44	W ¼ N	15
10	Meridian	57	21	E by S ¾ S	5			

TABLE N.

Rough Situations of the Stars, when certain ones are on the Meridian, in 49°. 30′ N. Lat., being the parallel of the British Channel.

Star, No. 14, *Betelguese*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 47°. 52 S.
The other Stars that are above the Horizon will be, viz.:—

No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.
1	W by N ½ N	23°	11	WSW ¼ S	82°	21	SE ¾ E	17°
2	W ½ N	14	12	S by W	31	22	E by S ¼ S	28
4	W bv N ¼ N	37	13	S by W ¾ W	68	23	NE ½ N	47
6	W by S	38	14	Meridian So.	48	24	E ¾ N	14
7	WSW ¾ S	19	16	S by E	22	27	NE ¾ N	23
8	SW ¾ W	30	17	SE ½ E	66	37	North	11
9	W by N	66	18	SE by S	42	41	NNW ½ W	11
10	SW by S	53	19	SE ½ E	61	44	W by N ¾ N	2

Star, No. 18, *Procyon*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 46°. 10′ S.
The other Stars that are above the Horizon will be, viz.:—

1	NW ¾ W	8	13	WSW ¼ S	56	24	E by S	30
4	WNW ½ N	21	14	SW by S	42	27	NE ½ E	35
6	W by N	21	16	SSW ¼ S	23	29	E by ¾ N	9
7	W by S ¼ S	4	17	S ½ W	73	32	NE ½ E	4
8	W by S ¼ S	16	18	Meridian So.	46	37	N by E ½ E	13
9	WNW ¼ N	49	19	S ¼ E	69	38	N by E	Hori.
10	WSW ¼ S	40	21	SSE ½ E	29	41	N by W	5
11	W ½ N	65	22	SE ½ E	43			
12	SW ½ S	23	23	NE ½ N	60			

Star, No. 22, *Regulus*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 53°. 20′ S.
The other Stars that are above the Horizon will be, viz.:—

4	NW ¾ N	3	18	SW ¼ W	36	31	E by S ½ S	2
9	NW	29	19	WSW	56	32	E by N ¼ N	26
10	W ½ N	16	21	S by W ¼ W	32	33	East	9
11	WNW ½ N	41	22	Meridian So.	53	35	E by N ¾ N	1
12	W by S ½ S	4	23	NNE	75	37	NE ½ N	24
13	W ½ N	33	24	SE ½ S	51	38	NE ½ N	9
14	W by S ½ S	22	26	SE ½ E	16	41	N by E ½ E	6
16	SW ½ W	10	27	ENE	56			
17	W by S ½ S	56	29	E ¾ S	34			

Star, No. 24, *Denebola*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 56°. 4′ S.
The other Stars that are above the Horizon will be, viz.:—

9	NW by N	19	21	SW ½ S	25	32	E ½ S	43
10	WNW ¼ N	Hori.	22	SW ½ S	48	33	ESE	26
11	NW ½ W	28	23	NNW	75	35	E ¼ N	17
13	WNW ¼ N	17	24	Meridian So.	56	36	E ½ N	13
14	W ½ N	6	26	SSE ¼ E	27	37	NE ½ E	35
17	W ¼ N	40	27	E by N	71	38	NE by E	22
18	W by S ½ S	22	29	SE by E	49	41	NE by N	13
19	West	39	31	SE ¾ E	17			

TABLE N.

Rough Situations of the Stars, when certain ones are on the Meridian, in 49°. 30′ N. Lat., being the parallel of the British Channel.

Star, No. 26, *Spica*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 50°. 44′ S. The other Stars that are above the Horizon, will be, viz.:—

No. of Star.	True Bearing.	Alt. °	No. of Star.	True Bearing.	Alt. °	No. of Star.	True Bearing.	Alt. °
9	N by W ¾ W	12	23	NW ½ N	67	35	E by S ½ S	32
11	NW ¾ N	18	26	Meridian	51	36	E by S	28
13	NW ½ W	4	27	E by N ¼ N	86	37	NE by E	48
17	WNW	25	29	SSE	60	38	ENE	35
18	West	7	31	SSE ¾ E	28	39	E by N	3
19	W by N ½ N	24	32	ESE ¾ S	57	41	NE ¼ E	22
21	WSW ¾ S	13	33	SE	39			
22	WSW ¼ S	36	34	SE ½ S	5			

Star, No. 29, *Arcturus*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 60°. 37′ S. The other Stars that are above the Horizon will be viz.:—

9	N by W	10	24	SW by W	45	34	SSE ½ E	10
11	NNW ½ W	12	26	S by W ½ W	30	35	ESE ¼ S	40
17	WNW ¾ N	17	27	W by N ½ N	86	36	ESE	36
19	WNW ½ N	16	29	Meridian	61	37	ENE ½ N	56
21	W by S ½ S	5	31	S by E ¾ E	32	38	E by N ¼ N	43
22	W ¾ S	27	32	SE ½ S	64	39	East	12
23	NW ½ N	61	33	SSE ¾ E	45	41	NE ¾ E	29

Star, No. 33, *a Serpentis*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 47°. 30′ S. The other Stars that are above the Horizon will be, viz.:—

1	NE	2	24	W by S ¼ S	31	35	SE by S	51
4	NNE ¾ E	1	26	SW ½ S	24	36	SE ½ S	48
9	N ½ E	9	27	W by N ½ N	71	37	ENE ¼ E	69
11	N by W ¼ W	7	29	SW ¾ S	56	38	East	58
17	NW	6	31	S by W	32	39	E by S ½ S	26
19	NW ¼ W	4	32	S ¼ W	68	41	ENE ¼ N	41
22	W ½ N	14	33	Meridian	48			
23	NW ¼ N	50	34	S by E	15			

Star, No. 36, *a Ophiuchi*, upon the Meridian in Lat. 49°. 30′ N., its Altitude being 61°. 12′ S. The other Stars that are above the Horizon will be, viz.:—

1	ENE ¼ N	17	26	WSW ½ S	10	35	S by W	55
2	E by N ½ N	6	27	WNW	55	36	Meridian	61
4	NE ½ E	14	29	W by S ½ S	41	37	E by N ½ N	86
9	NNE	14	31	SW ½ S	25	38	SE ½ E	75
11	N ½ E	6	32	SW by W	58	39	SE	41
23	NW by N	39	33	SW ¾ S	42	41	E by N	58
24	W ¾ N	15	34	S by W ½ W	14	44	E ¼ N	17

TABLE N.

Rough Situations of the Stars, when certain ones are on the Meridian, in 49°. 30′ N. Lat., being the parallel of the British Channel.

Star, No. 38, *Lyra*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 79°. 7′ S.
The other Stars that are above the Horizon will be, viz.:—

No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.
		°			°			°
1	E by N ¼ N	27	24	W by N ¾ N	4	35	SW by S	52
2	E ¼ N	16	27	WNW ¾ N	45	36	SSW ½ W	50
4	ENE ½ N	22	29	West	31	37	WNW ¼ N	83
6	ENE ¾ N	5	31	SW ¾ W	17	38	Meridian So.	79
9	NE by N	18	32	W by S ½ S	49	39	SSE	47
11	N by E ½ E	8	33	SW by W	34	41	East	69
23	NNW	30	34	SSW ½ W	10	44	E ¾ S	27

Star, No. 39, *Aquila*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 48°. 54′ S.
The other Stars that are above the Horizon will be, viz.:—

1	E ¼ N	38	27	NW ½ W	36	36	SW ¼ W	44
2	E by S	28	29	W ¾ N	20	37	WNW	73
4	E by N ¼ N	33	31	WSW	7	38	SW ½ W	74
6	E by N ½ N	16	32	West	38	39	Meridian So.	49
9	NE ½ N	25	33	W by S ¾ S	24	41	ESE.¼ S	80
11	NNE ½ N	12	34	SW	3	43	SE ½ S	1
23	NNW	29	35	SW by W	43	44	ESE ¼ S	38

Star, No. 41, *a Deneb*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 85°. 9′ S.
The other Stars that are above the Horizon will be, viz.:—

1	E by S	46	11	NE ¾ N	16	37	WNW	64
2	ESE	36	23	N by W ½ W	26	38	W by S ½ S	65
3	SE ¾ E	3	27	NW	29	39	S by W ¾ W	48
4	E ¾ N	41	29	W by N ¾ N	11	41	Meridian So.	85
6	E ¾ N	24	32	W by N	28	43	SSE ½ E	6
7	E ¾ S	0	33	W ½ S	15	44	SE ½ E	45
8	E ½ N	1	35	WSW	35			
9	NE ½ E	31	36	WSW ½ S	37			

Star, No. 44, *a Pegasi*, upon the Meridian, in Lat. 49°. 30′ N., its Altitude being 54°. 45′ S.
The other Stars that are above the Horizon will be, viz.:—

1	SE ¾ S	66	10	E ½ N	18	36	W ¼ N	14
2	SSE ¼ E	53	11	NE by E	33	37	NW by W	44
3	SSE	19	13	ENE	19	38	W by N ¼ N	42
4	ESE	63	23	Mer. below Pole	22	39	WSW ½ S	33
6	ESE	46	27	NNW ¼ W	16	41	W ¾ N	66
7	SE ¾ E	21	32	NW by W	8	43	Meridian So.	10
8	ESE ¾ S	22	35	W ¾ N	13	44	Meridian So.	55
9	ENE ½ N	51						

TABLE O.

Relative approximate Situations of Stars to find the Time by, when those in the left-hand column culminate: Parallel 10° North, intersecting the Bay of Bengal, China Seas, &c.

Stars on the Meridian.		Stars Eastward of the Meridian.						Stars Westward of the Meridian.					
No. of Star.	Altitude.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.
	° ′		°	°			°		°			°	°
2*a*	85.41 N	10	E 13 N	27	11	NE	18	38	W 37 N	11	39	W 4 N	25
6*a*	77.17 N	10	E 15 N	54	11	N 39° E	37	43	W 44 S	29	44*a*	W 9 N	45
10	83.49 N	14	E ½ S	71	16	SE ½ E	49	5	S 21 W	13	8*a*	W 15 S	66
14	87.22 S	18	E 7 S	64	22	E 10 N	29	10	W 19 N	69	12	S 27 W	69
18	85.37 S	22	E 9 N	54	27*a*	N 40 E	6	10	W 12 N	45	14	W 3 S	64
22	87.16 N	26	E 22 S	38	29	E 18 N	30	10	W b N ¼ N	9	16	W 27 S	33
24*a*	84.33 N	29	E 23 N	54	34	E 30 S	14	16	W b S ¾ S	11	18	West	27
26	69.39 S	29	NE ¼ E	74	38	NE ¾ E	15	17*a*	W 31 N	6	22	W ¾ N	41
29	80. 0 N	38	E 39 N	26	39	E ½ N	8	22	W 10 N	29	26	S 34 W	66
33*a*	86.55 S	38	NE	42	39	E ¼ N	30	22	W by N	8	29	W 26 N	66
36*a*	87.19 N	39	East	57	43	E 32 S	3	26	W 16 S	24	29	W 18 N	41
38	61.22 N	39	E 3 S	73	43	SE ¾ E	17	29	W 18 N	26	34	SW ¼ S	41
39	88.28 S	43	E 44 S	30	44*a*	E 10 N	43	29	W 19 N	9	34	SW ¾ W	29
41*a*	55.16 N	43	SE ¾ S	39	44*a*	E by N	56	38	NW ½ N	49	39	W ½ S	76
44*a*	85.38 N	1	NW ¾ N	67	10	E 15 N	10	38	W 38 N	24	39	W ¼ N	42

TABLE P.

Relative approximate Situations of Stars to find the Time by, when those in the left-hand column culminate: Parallel 37° North, intersecting the Mediterranean Sea, Cape St. Vincent, Chesapeake, &c.

Stars on the Meridian.		Stars Eastward of the Meridian.						Stars Westward of the Meridian.					
No. of Star.	Altitude.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.	No. of Star.	True Bearing.	Alt.
	° ′			°			°			°			°
2*a*	67.19 S	10	East	29	14	E ¼ N	9	38	WNW ¾ N	26	39	W ¾ S	24
6*a*	75.43 S	10	E by S ¾ S	51	18	East	9	1	W by S	63	38	NW ¼ W	8
10	69.11 S	17*a*	E ½ N	54	19*a*	E ¼ N	51	2*a*	W ¼ S	28	44*a*	W ¾ N	14
14	60.22 S	17*a*	E ½ S	70	22	E ½ S	29	2*a*	W ¾ N	12	6*a*	West	39
18	58.37 S	22	E by S ½ S	50	29	ENE	5	10	W by S ½ S	44	14	SW	52
22	65.44 S	29	East	35	33*a*	E ¼ N	10	10	W ¾ N	14	17*a*	W ¼ N	57
24*a*	68.27 S	29	E by S ½ S	55	38	NE ½ E	14	14	W ½ N	5	19*a*	W by N	38
26	42.39 S	35*a*	E ¾ S	15	38	ENE ½ N	30	18	W ¼ N	6	22	W b S ½ S	40
29	73. 0 S	38	ENE	40	39	E ¼ N	11	19*a*	WNW ½ N	10	22	W ½ S	30
33*a*	59.55 S	38	E by N ½ N	56	39	E by S	28	22	W ¾ N	12	29	SW by W	65
36*a*	65.41 S	38	E by N ¼ N	78	39	SE by E	49	26	WSW ¼ S	15	29	W ¾ S	44
38	88.22 N	2*a*	E ¾ N	14	44*a*	E ¼ S	28	29	W ¼ N	31	32*a*	West	50
39	61.28 S	2*a*	E ¼ S	28	44*a*	E by S ½ S	42	29	W b N ¼ N	17	38	W by N	75
41*a*	82.16 N	1	E ¼ N	47	2*a*	E by S	39	29	W b N ¾ N	7	38	W b N ¼ N	65
44*a*	67.22 S	10	E ¾ N	16	11	NE ½ E	25	38	WNW ¼ N	38	39	WSW	38

a Denotes Stars that are not of the first magnitude, all the others are.

TABLE Q.

Dr. Brinkley's Tables for North Latitude.

For finding the Latitude by the observed Altitudes of two fixed Stars, observed at the same time.

No. of Star.	Pairs of Stars.	Distance D, and Right Ascensions of Star F, in 1844.	Changes in 10 Years.	Angle C, of Comparison and North Polar Distance of Star F, in 1844.	Changes in 10 Years.
			′ ″	° ′ ″	′ ″
11	Capella.... N	65°. 48′. 1″ D.	+0. 3	17. 33. 56 C.	−3. 34
16	Sirius..... F	6h. 38m. 17s A.R.	+0. 26	106. 30. 24 P.D.	+0. 45
11	Capella.... N	51°. 6′. 59″ D.	0. 0	32. 9. 39 C.	−3. 10
18	Procyon... F	7h. 31m. 8s A.R.	+0. 31	84. 22. 48 P.D.	+1. 25
18	Procyon... N	87°. 32′. 37″ D.	+0. 2	83. 49. 41 C.	+1. 16
26	Spica...... F	13h. 16m. 59s A.R.	+0. 32	100. 20. 43 P.D.	+3. 9
18	Procyon... F	96°. 48′. 17″ D.	+0. 2	69. 2. 2 C.	+3. 28
29	Arcturus.. N	7h. 31m. 8s A.R.	+0. 31	84. 22. 48 P.D.	+1. 28
29	Arcturus.. N	56°. 1′. 10″ D.	−0. 7	37. 54. 4 C.	+3. 45
34	Antares... F	16h. 19m. 51s A.R.	+0. 37	116. 4. 47 P.D.	+1. 27
34	Antares.... F	71°. 41′. 23″ D.	+0. 4	26. 35. 1 C.	−3. 22
38	α Lyræ...... N	16h. 19m. 51s A.R.	+0. 37	116. 4. 47 P.D.	+1. 25
26	Spica..... N	45°. 54′. 17″ D.	+0. 1	78. 42. 16 C.	+3. 23
34	Antares.... F	16h. 19m. 51s A.R.	+0. 37	116. 4. 47 P.D.	+1. 27
34	Antares... N	82°. 50′. 54″ D.	+0. 2	116. 6. 56 C.	+1. 15
43	Fomalhaut F	22h. 49m. 1s A.R.	+0. 33	120. 26. 50 P.D.	−3. 11
38	α Lyræ..... N	91°. 25′. 27″ D.	+0. 3	44. 46. 8 C.	+1. 11
43	Fomalhaut F	22h. 49m. 1s A.R.	+0. 33	120. 26. 50 P.D.	−3. 11
29	Arcturus... F	59°. 1′. 27″ D.	+0. 24	56. 10. 42 C.	−2. 8
38	α Lyræ...... N	14h. 8m. 33s A.R.	+0. 27	70. 0. 10 P.D.	+3. 9

TABLE R.

Dr. Brinkley's Tables for South Latitude.

For finding the Latitude by the observed Altitudes of two fixed Stars, observed at the same time.

No. of Star.	Pairs of Stars.	Distance D, and Right Ascensions of Star F, in 1844.	Changes in 10 Years.	Angle C, of Comparison and North Polar Distance of Star F, in 1844.	Changes in 10 Years.
			′	° ′ ″	′ ″
5	Archernar N	39°. 7′. 18″ D.	−0. 1	33. 11. 40 C.	+1. 12
43	Fomalhaut F	22h. 49m. 1s A.R.	+0. 34	59. 33. 10 P.D.	+3. 11
12	Rigel...... F	23°. 40′. 46″ D.	+0. 5	67. 42. 38 C.	−4. 52
16	Sirius..... N	5h. 7m. 3s A.R.	+0. 29	81. 36. 47 P.D.	+0. 46
15	Canopus... N	60°. 8′. 6″ D.	−0. 10	12. 15. 58 C.	+3. 3
18	Procyon... F	7h. 31m. 8s A.R.	+0. 32	95. 37. 12 P.D.	−1. 28
16	Sirius..... F	57°. 43′. 28″ D.	−0. 7	15. 10. 52 C.	−3. 21
20	β Argus..... N	6h. 38m. 17s A.R.	+0. 26	73. 29. 36 P.D.	−0. 45
25	α Crucis..... N	52°. 58′. 56″ D.	+0. 1	8. 32. 32 C.	−1. 5
26	Spica...... F	13h. 16m. 59s A.R.	+0. 31	79. 39. 17 P.D.	−3. 9
26	Spica..... F	51°. 40′. 22″ D.	+0. 2	11. 24. 34 C.	+1. 3
30	α Centauri... N	13h. 16m. 59s A.R.	+0. 31	79. 39. 17 P.D.	−3. 9
26	Spica...... F	45°. 54′. 17″ D.	+0. 1	63. 33. 11 C.	+1. 6
34	Antares.... N	13h. 16m. 59s A.R.	+0. 31	79. 39. 17 P.D.	−3. 9

N denotes the star *nearer* the elevated Pole, and F the star *farther* from it.

Precaution.—"To insure greater accuracy, the stars when near the Zenith should not be used; and with a reference to finding the Time, the star F should not be near the Meridian."

TABLE S.—Astronomical Days in a Leap Year.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Day.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	Day.
1	0	31	60	91	121	152	182	213	244	274	305	335	1
2	1	32	61	92	122	153	183	214	245	275	306	336	2
3	2	33	62	93	123	154	184	215	246	276	307	337	3
4	3	34	63	94	124	155	185	216	247	277	308	338	4
5	4	35	64	95	125	156	186	217	248	278	309	339	5
6	5	36	65	96	126	157	187	218	249	279	310	340	6
7	6	37	66	97	127	158	188	219	250	280	311	341	7
8	7	38	67	98	128	159	189	220	251	281	312	342	8
9	8	39	68	99	129	160	190	221	252	282	313	343	9
10	9	40	69	100	130	161	191	222	253	283	314	344	10
11	10	41	70	101	131	162	192	223	254	284	315	345	11
12	11	42	71	102	132	163	193	224	255	285	316	346	12
13	12	43	72	103	133	164	194	225	256	286	317	347	13
14	13	44	73	104	134	165	195	226	257	287	318	348	14
15	14	45	74	105	135	166	196	227	258	288	319	349	15
16	15	46	75	106	136	167	197	228	259	289	320	350	16
17	16	47	76	107	137	168	198	229	260	290	321	351	17
18	17	48	77	108	138	169	199	230	261	291	322	352	18
19	18	49	78	109	139	170	200	231	262	292	323	353	19
20	19	50	79	110	140	171	201	232	263	293	324	354	20
21	20	51	80	111	141	172	202	233	264	294	325	355	21
22	21	52	81	112	142	173	203	234	265	295	326	356	22
23	22	53	82	113	143	174	204	235	266	296	327	357	23
24	23	54	83	114	144	175	205	236	267	297	328	358	24
25	24	55	84	115	145	176	206	237	268	298	329	359	25
26	25	56	85	116	146	177	207	238	269	299	330	360	26
27	26	57	86	117	147	178	208	239	270	300	331	361	27
28	27	58	87	118	148	179	209	240	271	301	332	362	28
29	28	59	88	119	149	180	210	241	272	302	333	363	29
30	29	..	89	120	150	181	211	242	273	303	334	364	30
31	30	..	90	...	151	...	212	243	...	304	...	365	31

TABLE T.—Astronomical Days in a Common Year.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Day.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	Day.
1	0	31	59	90	120	151	181	212	243	273	304	334	1
2	1	32	60	91	121	152	182	213	244	274	305	335	2
3	2	33	61	92	122	153	183	214	245	275	306	336	3
4	3	34	62	93	123	154	184	215	246	276	307	337	4
5	4	35	63	94	124	155	185	216	247	277	308	338	5
6	5	36	64	95	125	156	186	217	248	278	309	339	6
7	6	37	65	96	126	157	187	218	249	279	310	340	7
8	7	38	66	97	127	158	188	219	250	280	311	341	8
9	8	39	67	98	128	159	189	220	251	281	312	342	9
10	9	40	68	99	129	160	190	221	252	282	313	343	10
11	10	41	69	100	130	161	191	222	253	283	314	344	11
12	11	42	70	101	131	162	192	223	254	284	315	345	12
13	12	43	71	102	132	163	193	224	255	285	316	346	13
14	13	44	72	103	133	164	194	225	256	286	317	347	14
15	14	45	73	104	134	165	195	226	257	287	318	348	15
16	15	46	74	105	135	166	196	227	258	288	319	349	16
17	16	47	75	106	136	167	197	228	259	289	320	350	17
18	17	48	76	107	137	168	198	229	260	290	321	351	18
19	18	49	77	108	138	169	199	230	261	291	322	352	19
20	19	50	78	109	139	170	200	231	262	292	323	353	20
21	20	51	79	110	140	171	201	232	263	293	324	354	21
22	21	52	80	111	141	172	202	233	264	294	325	355	22
23	22	53	81	112	142	173	203	234	265	295	326	356	23
24	23	54	82	113	143	174	204	235	266	296	327	357	24
25	24	55	83	114	144	175	205	236	267	297	328	358	25
26	25	56	84	115	145	176	206	237	268	298	329	359	26
27	26	57	85	116	146	177	207	238	269	299	330	360	27
28	27	58	86	117	147	178	208	239	270	300	331	361	28
29	28	..	87	118	148	179	209	240	271	301	332	362	29
30	29	..	88	119	149	180	210	241	272	302	333	363	30
31	30	..	89	...	150	...	211	242	...	303	...	364	31

APPENDIX

TO THE

STAR TABLES,

FROM 1843, TO 1864, INCLUSIVE.

CONTAINING

RULES AND TABLES

FOR COMPUTING THE LONGITUDE AT SEA,

BY LUNAR OBSERVATIONS,

&c. &c.

DOVER:
PRINTED BY UNDERWOOD AND FOX.

APPENDIX.

EXPLANATION AND USE OF THE TABLES.

These Tables were originally computed by Mr. Israel Lyons, and published by him in the year 1766. They were very generally used at sea until it became known that several typographical errors existed in them, when they were laid aside, and other methods adopted. The extreme simplicity of clearing the lunar distance by them, induced the author to cause them to be entirely recomputed: which being effected, they were in 1825 published in a different form, in his "Lunar Tables," and with "Supplementary Tables," to be used conjointly with them when the True Distance was required to the nearest second. Of these latter Tables only two, numbered V. and VI. have been inserted here, since the joint effect of the remainder will never exceed 5 seconds in the angular distance, which in general sea practice is within the limits arising from the errors of observation.

TABLE I.

The arguments of Table I. are the apparent altitudes of the objects whose distance is to be cleared; the lesser Altitude being found at the top of the table, and the greater Altitude in the left hand column; under the former and opposite to the latter is the corresponding logarithm.

In cases falling to the right of the *black waving line,* or when both Altitudes exceed 50° the effect of refraction may be had at once from Table III.

TABLE II.

The arguments of this Table are the lesser Altitude and the apparent distance; under the former and opposite the latter is a number of seconds that are to be subtracted from the seconds deduced from Table I. &c., when the distance is less than 90°; but to be added thereto if the distance exceeds 90° The difference or sum is the effect of refraction, which is always to be *added* to the apparent distance.

TABLE III.

This Table shows the effect of refraction in seconds at sight, when both altitudes exceed 50°, or in any cases that fall to the right of the *black waving line* in Table I. it is entered with the apparent distance, opposite to which in the adjoining column is the corresponding refraction.

TABLE IV.

The head argument of this Table is the apparent distance; that in the left-hand marginal column is both for Parallax in Altitude, (found in Table XIII.)

and for Parallax in distance found by computation. The *difference* of the two numbers found in the area of the Table, corresponding to these arguments, is a correction in seconds, to be added to the distance if it be less than 90°, but to be subtracted if otherwise.

TABLES V. AND VI.

These Tables provide for the effect of the Sun's Parallax on the observed distance, and need only to be used but by the most expert observers.

The arguments are the Observed Distance, and the Moon's and Sun's Altitude respectively. The correction from Table V. is *always subtractive* from the distance, but the correction from Table VI. is *additive* when the distance is less than 90°, and *subtractive* if above 90°. These are for the third correction.

PROBLEM.

To find the Longitude of a Ship at Sea by Observations of the Moon's angular distance from the Sun, or a Fixed Star or Planet, and their Altitudes observed at the same time; the Latitude of the Ship and its Longitude, by account, being known.

1. *Rule.*—Turn the Longitude of the Ship by account, into time, by means of Table IX; and if it be West, add it to; but if it be East, subtract it from the estimated Mean Time at the Ship, when the observation was made; and the sum or difference will be the Mean Time at Greenwich nearly.*

2. With the Mean Time at Greenwich, take the Moon's semidiameter, and her horizontal parallax from P. III. of the Nautical Almanac; also the Sun's semidiameter for the day from P. II., and augment the Moon's semidiameter by adding to it the number of seconds found in Table XI, with her observed Altitude.

3. Correct the observed distance for index error and by adding to it the semidiameter of the Sun, and the augmented semidiameter of the Moon. But if the distance be with a Fixed Star or a Planet, the augmented semidiameter of the Moon only is to be applied;—additive if the Star be on the enlightened side of the Moon, but subtracted if otherwise. In other words, *add*, if Near Limb; and *subtract* if Remote Limb, the sum or difference will be the Apparent Distance.

4. Correct the observed Altitudes for index error and by subtracting the dip of the horizon, (Table X.,) and adding or subtracting the semidiameter of the object, according as the Altitude of the Lower or Upper Limb was observed; and the Apparent Altitude will be obtained.

THEN TO FIND THE EFFECT OF REFRACTION.

5 *Rule.*—In Table I. find what number answers to the two Apparent Altitudes

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* This Rule (1) is invariable and indispensible in all observations, unless a Chronometer be employed, which is always desirable to note *the time of observation by*. This not only serves to take out the *data* from the Almanac, but being compared with the the Greenwich time, resulting from the lunar observation, immediately shows the difference of longitude if there be any, between the Chronometer and the observations; and hence the Altitude of a Star at night, or of the Sun at an improper hour of the day, (to compute the time at ship by,) may safely be dispensed with until a more favourable opportunity offers, when the same difference will exist, provided the Chronometer be worthy of that name, and consequently the Longitude both by Chronometer and observation will be obtained.

of the Sun and Moon, or of the Moon and Star; the *lesser* of the two Altitudes being found at the top of the Table, the other in the first column on the left hand. Prefix the index 2 to this number, (considered as the decimal part of a logarithm,) and add it to the log. co-secant of the Apparent Distance; the sum, abating 10 in the index, is a logarithm of a natural number. Find this number, and if the distance be less than 90°, subtract from it the number corresponding to the given distance and the lesser of the two Altitudes in Table II.; or add them together, if the distance exceeds 90°, the difference or sum is the effect of refraction in seconds; which being *added* to the Apparent Distance, gives the distance cleared of refraction.

To Find the Effect of Parallax and the True Distance.

6 *Rule.*—Add together the sine of the distance cleared of refraction, the co-secant of the Sun or Star's Altitude *lessened* by refraction, and the pro. log. of the Moon's horizontal parallax; the sum rejecting 20 in the index is the pro. log. of arc 1st.

7. Add together the tangent of the distance cleared of refraction, the co-secant of the Moon's altitude *lessened* by refraction, and the pro. log. of the Moon's horizontal parallax; the sum is the pro. log. of arc 2nd. When the apparent distance is *less* than 90°, the *difference* of the two arcs is the principal effect of parallax in distance; to be subtracted from the distance cleared of refraction, if the first arc be greater than the second, but to be added if otherwise. When the apparent distance is *greater* than 90°, the *sum* of the two arcs is the parallax in distance, and in this case always to be *subtracted* from the distance cleared of refraction.

8. With the nearest minute of the Moon's horizontal parallax and her apparent altitude, take out from Table XIII. her parallax in altitude. Find the number of seconds answering to this and the apparent distance in Table IV. and in the same Table the number of seconds answering to the parallax in distance *already found;* apply the difference of these numbers to the distance as directed at the head of Table IV. and you will have the True Distance.

REMARKS.

9. In computing the effect of refraction, three places of figures, besides the index, will generally be sufficient for Table I.; but for finding the effect of parallax, the logarithms ought to be taken to four places, besides the index.

10. If the index of the proportional logarithm of arc first or second for parallax come out 19, so that 20 cannot be thrown off, add 0.3010 (the logarithm of 2) to the sum of the logarithms, and then abating 20 from the index find what number it answers to in the Table of proportional logarithms; which doubled, gives arc the first or second.

To Find the Greenwich Time, and Longitude.

11. Among the distances of the Moon's centre from the Sun and fixed Stars, put down in pp. xiii to xviii inclusive of the Nautical Almanac, find those two distances which are next less and next greater than the true distance, found from observation, and note the time under which the first distance stood: take the difference between that which stands *first* in the Almanac,

and the true distance, also the difference between the two distances taken from the Almanac,* from the proportional logarithm of the former difference, subtract the proportional logarithm of the latter difference; the remainder will be the proportional logarithm of a portion of time, to be added to the time which the distance, standing first in the Almanac, was computed for, the sum will be the Mean Time at Greenwich.

12. To this time take the Sun's declination out of p. II. of the Nautical Almanac or from this appendix; and correct the apparent altitude of the Sun's centre by subtracting from it the difference between the parallax found in Table XII. and the refraction found in Table XIV. the remainder will be the true altitude of the Sun's center; with these and the ship's latitude find the apparent time at the ship and convert it to mean time, by the equation of time from p. 1. of the Nautical Almanac, or from this Appendix.

13. The difference between the Mean Time at Greenwich, and the mean time at the Ship being converted into degrees by Table IX. will be the Longitude of the ship at the time of observation; *East* if the time at the Ship be greater than the time at Greenwich, but *West* if otherwise.

REMARK.

14. When the Moon's distance from a Planet is observed, by bringing the enlightened limb to the centre of the Planet, there will be no necessity to use the semidiameter of the Planet; and the horizontal parallax of the Planet is too small to effect any material error in the reduction of the distance. It may therefore be computed in the same way as with a star.

* The pro. log of this difference is now given in the Nautical Almanac.

EXAMPLE I.

Let the apparent distance of the Moon from a Star be 43.°35.′42″, the apparent Alt. of the Star 11.°17′, that of the Moon 9.°38′, and her horizontal parallax 54.′42″. Required the true distance?

OPERATION:

The number from Table I, answering to the two Altitudes and reduced, is found to be

……………………	* 2.0595				
App. dist. co.-sect. …………	10.1614				
Sum rejecting 10 in the index ..	2.2209	Log. gives	166 nat. num.		
Apparent distance …………	43.35.42	Number Table II, 121, with lesser alt. and dis.			
This is always added …………	+ 45	Effect of refrac.	45″ on the distance.		
Distance cleared of ref. (α) ….	43.36.27	Sine ….	9.8387 ……	Tan.	9.9789
App. Alt. Star—ref. …………	11.12.17	Co.-sect. ..	10.7115		
App. Alt. Moon—ref. …………	9.32.29	Co.-sect.	…………………		10.7805
Moon's hor. par. …………	54.42	Pro. log.	0.5173	pro. log.	0.5173
		′ ″			
Diff. of arcs. 1 and 2, *sub.* from ..	(α) 5.54	15.25 p. l.	1.0675	first arc.	
		9.31 ..	2nd arc.	pro. log.	1.2767
Distance cleared of ref. and par. ..	43.30.33	5.54 par. in dist. Table IV. ….			0″
Diff. of numbers from Table IV. ..	add 26	54. 0 par. in alt. Table XIII. IV.			26
The true distance …………	43.30.59	This is only 2″ less than Req. Tables.			

* This Log. being taken out for the nearest *degree* of Altitude in Tab. I, will be sufficient in practise, without reduction

EXAMPLE II.

March 23rd, 1843, about 5m. before 9, A. M., Civil Time, in Latitude 38° 5′ N. and Long. by acct. 19° East, the observed distance of the Sun and Moon was 85° 25′ 30″, the Altitude of the Sun's l. l. 31° 40′, that of the Moon's u. l. 19° 28′, elevation of the observers 20 feet, and their instruments having no index errors. Required the Longitude?

OPERATION:

	D. H. M.		° ′ ″		° ′ ″
Astronomical Time at the Ship ..	22.20.55	Sun's l.l. ..	31.40 .0	Moon's u.l.	19.28. 0
Long. by acc. in time equal	— 1.16	Dip for 20 ft	— 4.16	....	— 4.16
		Sem. dias.	+ 16 .3	augmented	— 15.31
Rough Greenwich Time	22.19.39				

Apparent Altitudes of the Sun and Moon	31.51.47	.... 19. 8.13
Refraction Table XIV	— 1.34	.... — 2.46
Apparent Altitudes lessened by refraction	31.50.13	...... 19. 5.27
Sun's par.	+ 8	
Sun's true Altitude	31.50.21	

		° ′ ″
Observed distance		85.25.30
Sun's sem. dia.		+.16. 3
Moon's sem. dia. 15′ 25″ aug. 6″		+.15.31
Apparent Distance		85.57. 4
Co. sect. ditto	10.0011	
Log. Table I, + index ..	2.1110	
Sum rejecting 10 log. ..	2.1121	
Nat. number	129	
Seconds from Table II ..	8	
Difference	121	= + 2.1

To find the Mean Time at the Ship.

	° ′		
Co. Lat.	51.55 N.	co-secant	10.10396
Sun's decl.	49 N.	Secant	10.00004
Mer. Alt.	52.44 nat. sine 79583		
Obs. Alt.	31.50 nat. sine 52745		
Diff. of nat. sines	26838	log.	4.42875
	H. M. S.		
Appt. time from noon	3.15. 6	rising	4.53275
Appt. time at ship	22.20.44.54	sub. from 24	
Equation of time ..	+ 6.55		
Mean ship time ..	22.20.51.49		

Dist. cleared of refraction	85.59. 5	sine	9.9989	.. tan.	11.1537
Sun's alt. lessened by ref.	31.50.13	co. sect.	10.2778		
Moon's Alt. do. do.	19. 5.27	co. sect.		....	10.4853
Moon's hor. par. N. A.	56.37	pro. log.	0.5023	....	0.5023
Sum rejecting 20 in the index is p. l. of arc 1st.		=	29.56.0.7790		
Sum rejecting 20 in the index is p. l. arc 2nd.		=	1.18		2.1413

Principal effect of parallax in distance	28.38	in Tab. IV. under 86° is 0″ under 86° and	
Distance cleared of refraction	85.59. 5	opp. hor. par. 57m. is	2
	85.30.27		
This correction never exceeds 10″	+ 2	third correction	2
True distance	85.30.29	0.46.48 p. l.	5850
Distance under XVIII h. the 22nd. N. Almc.	86.17.17		
Do. do. XXI h.	84.48. 6	1.29.11 p. l.	3050
		H. M. S.	
A portion of time	+	1.34.28 p. l.	2800
Time standing over 1st distance, in Naut. Almanac,		XVIII.	
Greenwich mean time by the observation		19.34.28	
Mean time at the ship		20.51.49	° ′ ″
Longitude in time		1.17.21 .... =	19.20.15 E.

The above is the entire work of a Lunar Observation, with the Sun.

EXAMPLE III.

July 25th, 1844, about 8h. 14m. Latitude 17.° 30′ N., Longitude by account 126° East, admit the obs. dist. of Moon's *remote* from the Star α Aquila be 58°. 43′. 25″, the index error 1′ *sub.*; the Star's Alt. 42° 6′; index error 3′ *sub.* the Moon's Alt. lower limb 49°. 32′; index error 2′ *add:* the elevation of the observers 18 feet above the level of the sea. Required the Longitude?

OPERATION:

	D. H. M.
Rough time at Ship	* 25. 8.14
Long. 126° East. Table IX	*sub*. 8.24
Estimated time at Greenwich ..	24.23.50
	° ′ ″
Obs. dist. cor. for index error ..	58.42.25
Moon's S. D. 16′ 18″ aug. 12″ ..	*sub*.16.30
Apparent distance	58.25.55
† Refraction Table III. 65″ =	add 1. 5
Distance cleared of ref. (*a*)	58.27. 0
Stars Alt. less ref.	41.57.52
Moon's Alt. less ref.	49.45.38
Moon's horizontal parallax	59.49
Principal effect of Par. in dist. See rule ...... sub. from (*a*)	18.57
True distance of Star and Moon	58. 8. 3
Dist. 24d. under XXIh. Nau. Alm.	59.35.47
—— 25th. Noon, —— ——	58. 2. 1

	° ′		° ′ ″
Star's obs. Alt,	42. 6	Moon's l.l.	49.32. 0
Index errors ..	*sub*. 3	......	*add* 2. 0
Dip for 18 ft.	*sub*. 4.3	Table X.	*sub*. 4. 3
		augd. S.D.	add 16.30
Appt. Alts. ..	41.58.57	......	49.46.27
Refrac. XIV.	*sub*. 1. 5	......	*sub*. 49
Alts. — ref. (*b*)	41.57.52	......	49.45.38
Sine ..	9.9305	tan	10.2118
Co-sect	10.1748		
Co-sect		....	10.1173
Pro. log.	0.4785	....	0.4785

′ ″			
46.59	0.5838	first arc.	
28. 2	pro. log.	second arc.	0.8076
1.27.44	pro. log.	....	3121
1.33.46	pro. log.	....	2832
H. M. S.			
2.48.25	=portion of time	..	0289

To find the Ship's Time by the true Altitude of α Aquila.

	° ′			
Co.-Lat.	72.30n.	co-sect. ..		10.02058
Star's Dec.	8.28n.	sec.		10.00476
Mer. Alt.	80.58	nat. sine	98760	
TrueAlt.(*b*)	41.58	ditto	66870	
Diff. of nat. sines and log.			31890	=4.50366

	H. M. S.	
Star's hour angle	3.14.13	ris. 4.52900
Reduc. Table H. *always sub*.	32	
Star's reduced hour, ang.	3.13.41	
	H. M. S.	
Cul. Table B.	11.28.9	
Lo. 126° Tab.C.+1.24=	11.29.33	cor. cul.
Mean Time at Ship ..	8.15.52 ‡	

XXI. 0. 0	Time standing over first dist. *n.a.*
24.23.48.25	Greenwich Mean Time
25. 8.15.52	Mean Time at Ship
8.27.27	Longitude .. = 126.51.45 E.

The above is the entire work of a Lunar Observation, with a Star.

---

* By putting down the *day* in this manner, no mistake can well occur in taking out the *data* from the Nautical Almanac correctly.

† When the logarithms, as in this Example, fall to the right of the *black waving line* in Table I, the refraction for the distance is found at once in Table III, opposite the apparent distance.

‡ This is an extremely neat method of finding the Mean Time by the Altitude of a Star.

TABLE VII.

15. This is a sexigesimal proportional Table for the reduction of the logarithms in Table I, for such as prefer it to the common arithmetical means of proportion by the rule of three.

Example.—What is the reduced log. for the altitudes 11° 17′ and 9° 38′ as in Example I, p. 6?

Operation.—Opposite to 11° and under 9° is 0598 = (*a*), immediately under this is 0697, the diff. is 99 for 60′ of *greater* alt. *increasing:* opposite (*a*) and under 10° is 0549, the diff. is 49 for 60′ of *lesser* alt. *decreasing.* Now in Table VII, under 99, say 100* and opposite 17′ (the minutes of gr. alt.) the quantity is *b* 28 + and under 49, say 50* and opposite 38′ (the minutes of lesser alt.) the quantity *c* is 32. — The diff. of *b* and *c* is 4 — which being subtracted from (*a*) gives 0594, to which prefix index 2, as directed in rule 5, when you will have 2.0594, the required log.

16. Take notice, that in reducing the numbers from Table I, they increase with the greater altitude, and decrease as the lesser altitude increases.

Example II. Required the logarithm corresponding to the greater altitude 35° 23′, and the lesser altitude 5° 47′?

Operation. Opposite 35° and under 5° is .... *a* = 5480
The diff, for 1° of gr. alt. is 101, pro. for 23′ is *b* + 38
The diff. for 1° lesser alt. is 624, pro. for 47′ is *c* — 487
The diff of *b* and *c* .... = 449 sub. from *a* 5031
To which prefix the index 2 and it will be 2.5031
the required logarithm.

TABLE VIII.

17. This Table contains the joint corrections for the effects of dip, refraction, parallax and semidiameter (sixteen minutes) additive to the observed altitude of the Moon's *lower* limb, to obtain the approximate true altitude of the centre at any elevation of the eye from 8 to 36 feet, + or — the difference between 16′ and her augmented semidiameter.

18. If the *upper* limb be observed, *subtract* the augmented *diameter* from the altitude, the remainder will be equal to the altitude of the lower limb *nearly,* which being corrected as above will give the altitude of the centre.

19. *Example.*—Let the observed meridian altitude of the Moon's lower limb (corrected for index error) be 58° 30′ South, on the 19th of Sept., 1844, in long. 40° West, the eye 16 feet above the level of the sea. Required the latitude?

Operation.—The Moon passes mer. of Greenwich by the Nautical Almanac at 6h. 16m. + 6m. correction Table XXVII,† = 6h. 22m. the time at the ship, and 40° West long. =2h. 40m. + makes the Greenwich time of observation 9h. 2m., for which the corresponding declination is 21° 8′ 19″ S. and hor. par. 58′ 55″ say 59′, under which and opposite observed altitude 58° 30′ in Table VIII, is 42½ to be added thereto, which with 3″ the excess of the semidiameter above 16′ makes the true meridian altitude 59° 12′ 33″

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* The nearest tenth is sufficient, thus for 143 say 140, &c.

† See Explanation of Table XXVII, p. 24.

	° ′ ″	
Mer. alt.	59.12.33	S.
Zen. dist.	30.47.27	N.
Declination........	21. 8.19	S.
Latitude	9.39. 8	N.

20. This Table will be found useful at any time to reduce the observed to the true Altitude of the Moon, whether on the meridian or otherwise.

TABLE IX.

21. This Table is useful for converting degrees and minutes of the Equator into time, and the contrary. The equivalents standing opposite each other, and separated by darker lines from those of other values. The method of using it is too obvious to need farther explanation.

TABLE X.

22. This Table shows the dip or depression of the horizon, below what it would be, if it were practicable to observe altitudes on the surface of the sea.

The correction is subtractive from the altitude of any object observed upon the visible horizon, according to the number of feet the eye of the observer is elevated, which is the argument of the Table. It is convenient to ascertain this quantity in smooth water before a Ship proceeds on her voyage.

TABLE XI.

23. This Table contains a correction to be added to the semidiameter of the Moon at certain altitudes against which it stands, on account of her being nearer to the observer the higher her altitude is. Thus in the zenith she is consequently a whole semidiameter of the earth nearer than when in the horizon.

TABLE XII.

24. This Table shows a correction to be added to the observed altitude of the Sun, being equal to the difference of altitude that would take place if the observation were made at the centre, instead of the surface of the earth. It is only required in rigid computation.

TABLE XIII.

25. Shows the Moon's parallax in altitude to the nearest minute only, for computing the true distance, for which see explanation of Table IV.

26. If it be wanted more correctly, it may be found by the following rule. *Rule.*—To the pro. log. of the Moon's horizontal parallax add the secant of the observed altitude (corrected for index error, dip and refraction) the sum is the pro. log. of the parallax in altitude accordingly. It must be added to the corrected, to obtain the true altitude.

27. *Example.*—Corrected altitude .... 18° 37′ .... sec. 10.0233
Hor. par. 55′ 47″ .... pro. log. 0.5088
Sum rejecting 10 in the index .... p. l. 52′ 52″ 0.5321

TABLE XIV.

28. Shows the effect of Refraction in a mean state of the atmosphere, for certain altitudes of any celestial body, against which it stands, and must be

subtracted therefrom, since the object by its effect is made to appear higher than it really is. The formula by which it is computed, is that of *Dr. Thomas Young:* as given in the Nautical Almanac.

29. Refraction in certain states of the atmosphere is known to differ materially from any known theory. The writer passing Cape L'Agullus (near the Cape of Good Hope) with several other observers all agreeing in then results, and being at least 10 miles southward of land in sight; upon pricking off the ship's place upon the chart, which was that of Major Rennel, it appeared we were sailing upon the land. This could only have been from the effect of refraction, which next to the clouds or thick weather (precluding a sight of the celestial objects altogether), is the greatest impediment that mariners experience in their observations, by means of its uncertainty.

30. The best method of guarding against its effects is, to let another person observe the supplement of the altitude in the opposite portion of the meridian, if the instrument will permit it. In which case use the apparently *upper limb*, which will appear to fall until the object is *up*, when it will soon have the appearance of rising. Now correct the altitude, thus, apply the index error as usual, *subtract* the dip, the semidiameter and parallax, and *add* the refraction (corresponding to the supplement of the altitude) the difference of the altitude so corrected and 180°, is the meridian altitude of the sun's centre; the mean of this and the altitude duly corrected by the first observer, if properly managed, is the true meridian altitude, whereby the latitude is found as usual. See art 35, Lynn's "Nautical and Astronomical Tables."

31. The above practise will do equally well with a Star or Planet in the twilight; or with two stars which lie in the opposite portions of the meridian.

TABLE XV.

32. This Table, originally published by Gardiner, is so contrived, as to have the whole in one view. The distances 1, 2, 3, &c., at the top and bottom, may be accounted 10, 20, 30, and the 10 as 100, &c. The minutes of latitude and departure (answering to the courses, being put down in degrees as well as in quarter points of the compass) are to be increased in the same proportion. If the distance consists of two or more significant figures, the diff. of lat. and dep. are to be taken out twice or more times accordingly, changing the decimal point as necessary.

33. The compactness of this table, in comparison with the more extended one that is given in most Nautical works, (by way of keeping the price of this manual within the pale of moderation,) has induced its insertion here in preference.

34. A little practice will make this table nearly as convenient as the common table, since there is no turning over the leaves in solving the traverse,—and in finding the direct course, distance and diff. of longitude by logarithms; it will be seen that the log. of both diff. of lat and dep. are repeated, and only four places of decimals required in the computations.

35. *Example.*—A ship from latitude 46° 10' N. longitude 18° 56' W. sails the following (corrected) courses and distances; *viz.* N. E. B. E. 7', E.N.E, ½ N. 13', N.E. 20', N.E. B. N. 17', S.W. B. W. 45', S. 63° W. 124', S. 18° W. 12'. *Required* the direct course and distance, and the latitude and longitude arrived at; also the bearing and distance of the Island of Corvo, and also of Cape Canso, Nova Scotia?

36.

CORRECTED COURSES	DISTANCE BY LOG.	DIFF. OF LAT.		DEPARTURE.	
		N.	S.	E.	W.
N.E.B.E.	7	3 ·9		5 ·8	
E.N.E.½N.	13 { 10 3	4 ·7 1 ·4		8 ·8 2 ·6	
N.E.	20	14 ·1		14 ·1	
N.E.B.N.	17 { 10 17	8 ·3 5 ·8		5 ·6 3 ·9	
S.W.B.W.	45 { 40 5		22 ·2 2 ·8		33 ·3 4 ·2
S.63°W.	124 { 100 20 4		45 ·4 9 ·1 1 ·8		89 ·1 17 ·8 3 ·6
S.18°W.	12 { 10 2		9 ·5 1 ·9		3 ·1 0 ·6
	238′	38·2	92·7 38·2 54·5	40·8	151·7 40 8 110·9

37.

Latitude left	46°10′ N.
Diff. of lat.	55 S.
Latitude in	45.15 N.
Sum of lats.	2)91.25
Middle Lat.	45 42½

38. *To find direct course.*

Diff. lat. 54·5 log.	1.7364
Dep. 110·9 log. + rad.	12.0449
Tan. of course 63° 50′	10.3085
Direct course	S.63°50′ W

39. *To find the direct distance.*

Diff. of lat. log.	1·7364
Course 63°50′ sec.	10.3556
Sum rejecting 10.	2.0920

gives log. of direct dist. = 123′·6.

40. *To find the diff. long.*

Mid. lat. 45° 43′ sec.	10.1560
Dep. 110′·9 log.	2.0449
Sum rejecting 10 = log.	2·2009
which gives diff. long.	158 8 = 2°39′ W.
Long. left	18.56 W.
Long. in	21.35 W.

41. *To find the bearing and distance of the Island of Corvo*

Latitude of the Ship .... 45°15′ N. mer. parts .... 3051 Long. Ship ...... 21.35 W.
Corvo .... 39.41 N. .... 2598 .... Corvo ...... 31. 6 W.

Diff. of lat. = 334′ .... 5.34 .... 453 diff. long. = 571′ .. 9.31

Then by Mercator. mer. diff. lat. : rad. : : diff. of Long. : tan. Bearing or course and cos. course : prop. diff. lat. : : rad : distance.

Mer. diff. of lat. 453′ log.	2.6561	Course 51°34′ cos.	9.7935
Diff. long. 571′ + rad. .. 10 .. =	12.7566	p. diff. lat. 334 log. + rad. 10. =	12.5237
Tan. of bearing of Corvo S. 51°34′ W	10.1005	log. of distance of Corvo. 537′ ..	2 7302

42. *Now to find the bearing and distance of Cape Canso.*

Lat. Ship	45°15′ N.	Long. of the Ship	21°32′ W.
Lat. C. Conso	45.20 N.	Long. of Cape Canso	60.55 W.
Diff. of lat.	0. 5	Diff. long. .... 2363′ =	39.23

The Ship being nearly in the same latitude as C. Canso, and so far to the eastward of the Cape, its distance will be found nearly by parallel sailing; thus,

Rad. : cos. lat. : : diff. long. : distance.

Lat. (say) 45°18½′ cos.	9.8472
Diff. of long. 2363′ log.	3.3735
Sum rejecting rad. = dist. 1662.... log.	3.2207

43. In Art. 40, the difference of Longitude is found by MIDDLE LATITUDE SAILING; the following method is that by MERCATOR'S SAILING:

	° ′		
Latitude left	46.10 N.	Mer. parts	3130
Latitude in	45.15 N.	Ditto ditto	3051
	55	Mer. diff. of lat.	79

As radius	10·0000
Is to mer. diff. of lat. 79 ..	1·8976
So is the tan of course 63°50′	10·3085
To diff. long. — rad. log.	2·2061 = 160′·7

44. When a ship Sails due East or due West, the distance and departure are the same; the difference of longitude is then found by PARALLEL SAILING, thus:

Example.—A Ship in latitude 45° 43′ N. sails 110′·9 due West, required her difference of longitude?

As co-sine of lat. 45° 43′	9·8440
Is to radius	10·0000
So is dist. run 110′·9 + radius =	12·0449
To the diff. of longitude	2·2009 = 158′·8

45. It will be perceived that the results of Arts. 40 and 44 are alike, being computed on the same principle; for the arithmetical complement of the co-sine of an arc, is equal to the secant of the same arc less radius.

46. In comparing MERCATOR'S SAILING with MIDDLE LATITUDE SAILING, the first of these is most proper to be used by such persons as depend solely upon their dead reckoning, because in MIDDLE LATITUDE SAILING the arithmetical mean, or half sum of the co-sines of the two distant latitudes, is not exactly the co-sine of the middle latitude, or half the sum of those latitudes, and consequently is not strictly accurate. The difference is seen in the results of the two methods by comparing the difference of longitude found by Art. 40, and that by Art. 43, the latter giving 1′·9 more than the former.

TABLE XVI.

47. This is a stereotyped table which the author published several years ago, with his "*Practical Methods*" *for finding the latitude by Trial and Error*; it was intended chiefly for the purpose expressed at the head of the table, for which an example or two will not be superfluous here.

48. *Example.*—At 9, A. M., the *true* altitude of the Sun was observed to be 25° 30′, bearing East by South; the Ship then sailed S. S. E. 17 miles, (the course being corrected for lee-way only,) the Sun's *true* altitude was then 41° 17′. *Quere,* What is the correction to be applied to the first altitude to reduce it to what it would have been if observed at the place where the second altitude was?

Operation:

Sun's bearing at the first observation, E. by S. = 7 points.
Ship's course in the interval, S. S. E. .... = 4 points.
Angle between them .... 3 points.

This, and the distance 17′ in the Table, gives 14′ 8″ which being added (because the angle is less than 8 points) to the first altitude 25° 30′ gives 25° 44′ 8″ the corrected altitude, or such as it would have been if observed at the second station.

49. *Example.*—About 2 P. M. the *true Altitude* of the Sun was observed to be 56° 50′ bearing W. S. W. ¼ S; the Ship sailed N. E. 5′ E. N. E. 3′ and E. by S. 6′ making no leeway, the Sun's *true Altitude* was then 41° 17′. Required the correction to be applied to the first Altitude?

Operation.—The reduced course is E. N. E. ½ E. nearly, and the reduced distance 11′.

Sun's bearing at first observation W. S. W. ¼ S. = 5¾ pts.
Ship's reduced course in the interval E. N. E. ½ E. = 9½ pts. reckd. from the S.

Angle between them........................ 15¼ pts., with which and

the reduced distance 11′ in the table gives 10′ 53″ to be *subtracted* (because the angle is more than 8 points) from the first altitude 56° 50′, gives 56° 39′ 7″ the corrected altitude.

50. The total neglect of the above correction, or its misapplication, is not unfrequently the cause of disappointment in the result of the double altitude problem worked by whatever method it may be.

51. The reasonableness of the aforesaid correction may be thus practically explained. Suppose an observer in a ship A. takes an altitude of the Sun, and at the same instant another observer in a Ship B. takes the altitude also, the Ship's being 10 miles apart, and B. on the same point of bearing as the sun is from A.—Now let the ship B. remain stationary and the Ship A. continue her course, and join company with B., now let them take the second altitude in both Ship's together, which altitudes will be alike, but the first altitudes will not be so, for they will differ in quantity according to the distance of the two Ships when the first altitudes were taken; therefore if A. does not *add* 10′ to the first altitude, their *data* will not be alike, and consequently the results of their computations cannot be. Hence the necessity of using the aforesaid correction, in addition to the usual corrections of altitudes.

52. Now had the Ship A. remained stationary after the first altitude; and the Ship B. joined company with A., and both taken the second altitudes together; then B. must have *subtracted* 10′ from her first altitude because she was receding from the Sun; whereas in the first case A. was approaching

the Sun; the line or bearing on which the Ships run being the same as the Sun's bearing at the first altitude is, as before seen, direct, and consequently the distance and correction are alike; but in all other cases where an angle will take place between the corrected courses in the interval, and the Sun's bearing at the first altitude, with the reduced distance *as in Art.* 49 will at once be shown in the Table XVI, under explanation.

53. This Table will be found further useful, in the absence of the common traverse Table, in "working the board"* in which case the computer has only to convert the (″) to tenths by dividing the seconds by 6, which can be done mentally without inconvenience, and the departure is found by taking the complement of the course thus, for *Example.*—Let the course be N. N. E. ½ E. 25′—N. N. E. ½ E. is 2½ points with which and the distance 25′ gives the diff. lat. 22′ 3″ = 22′·1 † then to find the departure, the complement of 2½ points is 5½ points, with which and the distance 25′ in the Table gives 11′ 47″ = 11′·8 the same quantities as will be found in the common traverse Table.

TABLES XVII TO XX.

54. These four Tables show the Equation of Time from 1842 to 1845 inclusive. They will answer for every corresponding fourth year with sufficient accuracy for nautical purposes. Thus, 1842 serves for 1846,—1843 for 1847, and so on. The quantities are given to the nearest second for Mean Noon at the meridian of Greenwich. The words *add* and *sub.* at the head of each column, and sometimes in the body of the tables, show the application of the Equation of Time to Mean Time, for reducing it to Apparent Time. But the contrary process must be used when reducing Apparent into Mean Time. To take the Equation of Time out for any intermediate time, the estimated Greenwich Time must be used.

Example.—The difference of the Equation of Time between the first and second of January, 1844, is 28s. for 24h., therefore if the estimated Greenwich Time be (say) 6h. past noon of the first, that is consequently one quarter of the whole difference equal 7s., which as the equation is increasing must be added to what it was at noon on the first, which reduces it to 3m. 42s., (see Table XIX,) the equation of time required. And so for any time in proportion. If the proportion should exceed the equation at noon on the preceding day their difference will be the required equation, of the same sign as the greater.

Example.—Required the equation of time on the 14th of June, 1844, at 16h. 45m. Greenwich Time?

Operation.—On the 14th, the equation of noon is 0m. 4s. *add,* and on the 15th it is 0m. 9s. *sub.*, therefore the diff. for 24h. is 13s., or rather more than half a second an hour, and consequently the proportion for 16h. 45m. is 9s., — and the equation at noon on the 14th is 0m. 4s. + the difference 5s. — (or 0m. 5s. sub.) is the reduced equation of time, as was required.

TABLES XXI TO XXIV.

55. These Tables contain the Sun's Declination from 1843 to 1846 inclusive. The declination is put down in the Tables for Apparent Noon at

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* Reducing the courses and distances by log.

† The seconds in this case are only 3, which are half a tenth but taken as one tenth as is customary in this as in other computations.

the meridian of Greenwich, and when required for any intermediate Greenwich Time, may be reduced by the same process as exemplified in Art. 54, for the reduction of the Equation of Time, or by means of Table XXV.

TABLE XXV.

56. The arguments of this Table are the days of the months as expressed in two columns on each side of it, and the longitude for every 10 degrees at the top; and the corresponding values (40m) in time, at the bottom of the table, opposite to the former and below the latter arguments respectively, is the corresponding quantity in minutes and tenths* to be applied agreeably to the directions in the side columns accordingly.

57. *Example.*—Required the Sun's declination on the 6th of January, 1844, at Apparent Noon, in 90° E. longitude?

Operation.—Under 90° and opposite the 6th of January is 1′·7 = 1′ 42″, which according to the directions at the head of the column standing over the day of the month being ***added*** to 22° 35′, the declination at noon on the 6th of January gives 22° 36′ 42″, the corrected declination required.

58. *Example.*—Required the declination at 4h. 20m. P. M. on the same day, and in the same longitude as in Art. 57?

Operation.—Over 4h. and opposite the 6th of January is 1′·2, and in the next column to the right is 1′·4 the increase is therefore two tenths for 40m., and consequently one tenth for 20m., therefore the whole correction is 1′·3 = 1′ 18″ to be subtracted from the declination at noon as found in Art. 57; (agreeably to the directions at the foot of January column) which reduces it to 22° 33′ 42″ the required declination.

59. In the foregoing examples it will be seen that the corrections are taken out to the nearest tenth; whereas the declination itself is set down in the tables to the nearest minute only, which in general practice is sufficiently near.

60. When the Sun's declination is required for noon, (to compute the latitude by the meridian altitude of the sun,) the correction may be had from this table by one simple reference. For *Example.*—What is the correction for the declination at noon on the 7th of February, 1844, in 120° W. longitude?

Under 120° and opposite the 7th of February, is 6′·0 to be ***subtracted***, agreeably to the directions at the head of the column for February, therefore the reduced declination for that day is 15° 23′ S.; but had the longitude been East instead of West, the corrected declination would have been 15° 35′ S. (see Table XXII.)

61. The reason of the above correction will appear evident, when it is considered, that at noon day in 120° W., it is 8h. 0m., P. M., on the 7th at Greenwich; but in 120° E. longitude, it is only 16h. 0m. the 6th at Greenwich; that is, 4h. 0m. A. M. on the 7th day, by civil reckoning.

TABLE XXVI.

62. This Table is partly exemplified in the page wherein it is printed. It is scarcely necessary to observe that when the sun's declination is required for

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* Tenths are converted into Seconds by multiplying them by Six.

years subsequent to 1846, *say* for 1847, that is, four years from 1843; therefore the Table XXI is the one to be selected for 1847; and the four-yearly quantities in this Table are applicable to the declination in that Table accordingly. In like manner Table XXII corresponds to 1848, and so on in four-yearly intervals.

TABLE XXVII.

63. This is a copy of the original table, and its explanations, (found in the same page with it,) as published in the "*Requisite Tables*" by the late *Rev. Dr. Nevil Maskelyne*, D. D., F. R. S., Astronomer Royal; to whom the Maritime world is highly indebted for the great assistance they have received, not only from the Requisite Tables, Nautical Almanacs, &c., but for the clear and unambiguous precepts that accompanied them.

Any further explanation of this table is deemed superfluous.

64. TABLES XXVIII TO XXXI.

These Tables contain the declination of the planet Venus for Mean Noon at Greenwich, and the time of her passage over that meridian, for every day of the year. On any other meridian the declination must be reduced to the corresponding time at Greenwich. These Tables are inserted purely with the view to find the latitude by the meridian altitude of this planet. The author was in the common practice of performing this beautiful observation, in clear weather, whenever the planet passed the meridian from three hours to two hours, either before or after noon; and sometimes within one hour and a half of noon, when the planet was in her greatest brilliancy; this part of her phase may be generally ascertained by her appearance in the morning or evening twilight. The observation is best made by means of a sextant or quadrant, having a good direct telescope attached to it. The rough meridian altitude may previously be worked by means of the estimated latitude and the planet's declination (as seen in art. 109, p. xxxiv) and the corresponding arc lessened a few minutes according to the star's distance from the meridian. The observer then directing his sight a little *eastward* of the true south or north according as the planet is south or north of the ship, (which is always known by comparing the planet's declination with the ship's latitude,) will enable him to discover the image of the planet about the horizon, and to observe its meridian altitude accordingly; and consequently to obtain his latitude. *See Lynn's "Nautical and Astronomical Tables." Arts.* 245 *to* 249.

TABLE XXXII.

65. This Table contains the joint correction of the altitude of the sun's lower limb on account of dip, refraction, parallax, and semidiameter (16′) which is always to be added to the altitude of the sun's lower limb (corrected for index error). When great accuracy is required, the seconds found in Table XXXIII, are to be applied to the altitude, as above corrected, agreeably to the sign + or — which is printed with the seconds. The result is the true altitude of the sun's centre.

66. If the sun's upper limb be observed, subtract the whole diameter from the observed altitude, and proceed as if the lower limb had been observed; unless it be a low altitude, when it will be more accurate to apply the corrections separately, because the refraction will not be the same at both limbs.

d 2

TABLE XXXIII.

67. This little Table shows the number of seconds the sun's semidiameter is more or less than 16′ at certain periods of the year; whereby the true semidiameter is ascertained as exemplified in Art. 66. Thus the sun's corrected semidiameter on the 1st of June, is 15′ 48″, and consequently his whole diameter is 31′ 36″.

TABLE XXXIV.

68. This Table is sufficiently explained at the bottom of page 29, where it is printed. It is inserted to prevent the mistake that not unfrequently happens when observing the sun's amplitude, which is often erroneously taken at the last glimpse of the sun.

THE COMPUTATION OF THE TRUE AMPLITUDE AND AZIMUTH.

It will now be shown how the true amplitude and the true azimuth of any celestial object are computed, their declination being known.

69. To find the true amplitude of a celestial object. *Rule.*—To the log. secant of the ship's latitude at the time of observation, add the log. sine of the object's declination: the sum, rejecting 10 in the index, is the log. sine of the true amplitude, to be reckoned from the west at setting, and from the east at rising; and towards the north or south, according as the declination be north or south, at the time of observation.

Example.—What is the true amplitude of the sun, in the morning, in latitude 40° 10′ N., when his declination is 23° 15′ S.?

Operation.

	° ′		
Latitude ……	40.10	Sec.	10·11681
Declination ….	5.15	Sine	8·96143
True Amplitude	6.53	Sine	9·07824

It being morning and the declination south, the true amplitude is E. 6°53′ S. accordingly.

Then let us suppose that the compass-bearing or magnetic amplitude of the sun was observed to be E. 29° S.; the difference, which is 22° 7′ is the variation or error of the compass.

Now to determine whether the variation be east or west, let the observe (looking to the east) observe if the true amplitude be to the left or right of the magnetic amplitude: it appears the true is to the left of the other; therefore the variation is westerly, for it is evident if a ship steers by this compass on any point, *say* south, her true course is S. 22° 7′ E.

70. Having the latitude of the place, the sun's declination, its altitude, and the magnetic azimuth, to find the true azimuth and variation of the compass.

Rule.—Add together the polar distance, the co-latitude, and the co-altitude; from half their sum subtract the polar distance, and note the remainder; add together the co-secant of the co-latitude, the co-secant of the co-altitude, the sine of the half sum, and the sine of the remainder: half the sum of these logarithms (rejecting 20 in the index) is the co-sine of half the true azimuth, which doubled gives the true azimuth accordingly; to be always reckoned from the north in north latitude, and from the south in south latitude.

Example.—Sept. 25th, 1844, latitude 15° 17′ N.; longitude 82° E.; the sun's true altitude is 6° 40′. Required the sun's azimuth and the variation of a compass by which the sun's magnetic azimuth was S. 86° 20′ W., the time at the ship about 5h. 30m. P. M., and the corresponding Greenwich time is consequently noon day on the 25th, and the sun's declination at that time is 0° 59′ S.

Operation.

Sun's dec. ..	0°59′ S.	Lat. ..	15°17 N.	True Alt. ..	6°40′
P. D.	90.59 *	Co-lat.	74.43	Co-alt.	83.10

	° ′		
P. D.	90.59		
Co-lat.	74.43	Co-secant	10·01564
Co-alt.	83.10	Co-secant	10·00310
Sum	248.52		
Half sum..	124.26	Sine	9·91634
P. D.	90·59		
	33.27	Sine	9·74132
			19·67640
Co-sine ½ true azimuth	46°27′	......	= 9·83820
	2		

True azimuth .... N.92.54 W.
Mag. azi. S. 86°20′ W. = N.93.40 W.

Variation of the compass .. 0 46 E.

71. According to the precept, Art. 69, the variation is evidently east, for the observer (turning his face towards the sun) will now find that the *true* is to the right of the magnetic azimuth, and therefore the variation is east.

The variation may be found as above by means of a fixed star, planet, &c., the declination of which is known.

LATITUDE BY TRIAL AND ERROR.

72. *Given the Latitude by account, two Altitudes of the Sun, or a fixed Star, its Declination, and the elapsed time* A *(measured by a good watch or chronometer) to find the true Latitude.*

Rule.—Let the measured interval be A. Find the hour-angles *from noon* for both (*true*) altitudes; their sum or difference is B; that of the two agreeing nearest to A, will be the first proof that the latitude by account, is either true or erroneous; for if the latitude used in the computations is the true latitude, B. will be nearly the same as A, the measured interval. If it be more or less than A, the latitude by account is not the true latitude.

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* When the declination of the object and the latitude of the ship are one north and the other south, the declination added to 90° is the polar distance; but when the latitude and declination are of the same name, the complement of the declination is the polar distance.

73. Assume another latitude at discretion, and repeat the above operation (several of the logs. of which will come into use in this part) the sum or difference of the last found hour-angles is C. Here may happen three cases, 1st. A. may fall between B. and C. the two computed elapsed times. 2nd., B. and C. may be greater than A. 3rd., B. and C. may be less than A. In either of the two latter cases it will appear which of the two latitudes used in the computations is nearest the truth; for it will be that which has its computed elapsed time nearest to the measured elapsed time A.

74. The diff. between B. and C. is D., the first term in direct proportion; the difference between the two latitudes L. the *second* term; and the third term is the difference between A. and B. or C; the one nearest to A. being the most proper. The result of this (rule of three) proportion will be a number of minutes to be applied + or — to the latitude nearest the truth, and the sum or difference will be the latitude by the first operation. The latitude so computed will seldom require another operation; if it should, or if proof be required, proceed afresh, taking the last found latitude to compute the hour-angles and elapsed time, which being found, call it C. 2, and in the proportion use C. and C. 2. instead of B. and C, which if the *data* be correct will approximate more and more till the latitude be found.

75. In this method it is to be observed, that although the two altitudes, the declination, and the elapsed time, be each of them accurately known, the latitude by the ship's reckoning may be supposed greater or less than the true latitude, by such a number of degrees or minutes, that the elapsed time cannot be computed from it and the other data; this at first sight seems an imperfection in this method, *but it is an advantage*, as will appear from the following consideration.

76. If when the sum of any two of the following quantities (which enter the computation) *namely* the co-latitude, polar distance, and either of the co-altitudes, doth not make as many degrees and minutes as are in the third of them, the question is impossible; because any two sides of the spherical triangle together are greater than the third side; consequently, the error is in the co-latitude and latitude by account or assumed; and this instantly points out a greater or less latitude to be taken nearer the truth. Hence also in many cases, an easy method ariseth of knowing how to make the assumption at first sight, within proper limits at least, and so as to come near the truth *by one operation*, with the ship's latitude by account..

77. Although a single operation by this method has more figures than some others, they are easily to be taken from the tables, and several of them, *repeat* throughout an operation; this lessens a great part of the labour that would otherwise happen.

78. This is a general method whereby corrections in latitude can be made, and particularly of places in the interior of countries, and on the coasts, sufficiently exact for geography and navigation; being careful to correct the altitude for change of position (see Table XVI), as well as for the usual corrections; and to insure success, let both altitudes be taken when the sun is on the same side of the prime vertical.

79. In the lunar method of finding the longitude at sea, this method is applicable; first, for discovering the latitude, by having any two altitudes and the elapsed time; and secondly, for discovering the time at the ship: to be compared with the Greenwich time: the sum or difference of these being the longitude.

80. It is also applicable for taking the variation at sea, at any time or place; for the latitude being hereby known, the true azimuth becomes known, and the difference between the true and magnetic azimuths is the variation.

81. This method being confined to no particular limits of elapsed time, may therefore be applied universally anywhere. Near the equinoctial line, the elapsed time between the two observations may be for any part of the day, under a quick change of the sun's altitude, and without error from the earth's spheroidal figure; and in high latitudes any part of the day may be employed for the latitude by this method.

82. Thus may this method be practised, without entering into a consideration of the various cases of spherical triangles, which must be known in going through the solution after a direct manner; for in the present method of solution, when the latitude is correct, the elapsed time computed therefrom, will be nearly the same as that measured; and in other cases the accuracy will depend on that of the *data*, and the reductions to the circles of the sphere.

83. *Example.*—Suppose between the parallels of 49° and 50° of N. latitude at 6h. 15m. 42s. A. M., the true altitude of the sun's centre was 6° 10′; again at 5h. 27m. 33s., the true altitude was 14°, the sun's declination being 12° N. Required the Latitude? (N. B. The ship is supposed to be stationary.)

Operation.—It will be advisable in the practice of this problem at once to assume two latitudes, that are supposed to include the true latitude, since the logarithms can be taken out with as little trouble for the two assumptions as for one, or nearly so; arranging them as in the formula below.

	H. M. S.
Time of first observation ……	6.15.42
Time of second observation ….	5.27.33
	48. 9 = A.

First assumed latitude 49°	Second assumed latitude 50°
Lat. …… 49°. 0′ N. Sec. …. 10·18306	Lat. …… 50°. 0′ N. Sec. …… 10·19193
Co-lat. …. 41. 0 N.	Co-lat. …. 40. 0 N.
Dec. …… 12. 0 N. Sec. …. 10·00960	Dec. …… 12. 0 N. Sec. …… 10·00960
Mer. Alt. 53. 0 N. n.s. 79864	Mer. Alt. .. 52. 0 N. n.s. 78801
True Alt. 6.10 n. s. 10742	True Alt. .. 6.10 n. s. 10742
69122 log. 483962	68059 log. 4·83289
Log. ris. 6h. 17m. 42s. ris. …… 5·03228	6h. 18m. 55s. ris. 5·03442
Lat. …… 49. 0 N. Sec. …. 10·18306	Lat. …… 50. 0 N. Sec. …… 10·19193
Co-lat. …. 41. 0 N.	Co-lat. …. 40. 0 N.
Dec. …… 12. 0 N. Sec. …. 10·00960	Dec. …… 12. 0 N. Sec. …… 10·00960
Mer. Alt. 53. 0 N. n.s. 79864	Mer. Alt. .. 52. 0 N. n.s. 78801
True Alt. 14. 0 n. s. 24192	True Alt. .. 14. 0 n. s. 24192
55672 log. 4·74564	54609 log. 4·73727
5h. 29m. 33s. …. ris. …. 4·93830	5h. 29m. 47s. …. ris. …. 4·93880
6h. 17m. 42s.	6h. 18m. 55s.
48m. 9s. B.	49m. 8s. C.

Observed interval A. 48. 9 } 0. 0

Interval in 49° .. B. 48. 9 } 0.59 = D.
Interval in 50° .. C. 49. 8

84. It will immediately be perceived that the first assumed latitude, namely 49° is the true latitude, for the computed and the measured interval are the same; it may further be observed that the same declination has been taken for both the altitudes, but when precision is required the declination should be corrected for the Greenwich time of both observations.

85. We will now suppose that B. had come out 48m. 24s. *Quere.* What would the latitude have been in that case? This is 15s. more than the computed interval in 49°, therefore the correction is thus found, D. 44s.: 60′ : : 15s. to 20′ 27″, which added* to 49° = 49° 20′ 27″ the true latitude. *See Art.* 74.

86. The only difference between the above operation, and that by means of a fixed star, is that the measured interval A. must be increased by the seconds answering thereto found in Table H; and since the hour-angle of a star has been already exemplified, (*see Arts.* 50, 51 *and* 109,) and as there is no trouble in the reduction of the declination of a star, the work will be equally easy as by the sun.

87. If two fixed stars observed at the same time are made use of in this problem, the difference of their right ascensions will be A. without reduction, and the remaining part of the operation will be similar to that of the sun.

88. *Problem.—The apparent time, the ship's latitude and longitude being given, to find the sun's true and apparent altitude.*

Rule.—Reduce the sun's declination from page I. of the Nautical Almanac, corresponding to the Greenwich time.

If the sun's declination and the co-latitude of the ship be one north and the other south, take their difference; but if they be both north or both south, take their sum for the sun's meridional altitude. If that sum be greater than 90°, take it from 180°.

With the apparent time from noon, take out the log-rising, to which add the co-sine of the latitude, and the co-sine of the sun's declination: their sum, rejecting 20 from the index, will be the logarithm of a natural number, which being subtracted from the natural sine of the meridional altitude, will give the natural sine of the sun's true altitude at the given time. Add the difference between the sun's refraction, Table XIV, and its parallax in altitude, Table XII, to the true altitude, and it will give the sun's apparent altitude.

89. *Example.—Required the sun's true and apparent altitude on the 7th of May,* 1844, *at 9h. 2m. 30s. apparent time, A. M. Latitude* 40° 15′ *North longitude,* 17° *West.*

	D. H. M. S.				° ′ ″
Given time	6.21. 2.30	Dec. noon, 7th			16.55.14 N.
Long. 17° W.	+ 1. 8.	Table XXV. 1·3			= — 1.18
Greenwich time	6.22.10.30	Cor. Dec.			16.53.56 N.
Time from noon	2h. 57m. 30s.	Ris.			4·45518
Lat.......	40.15 N.			Co-sine	9·88266
Co-lat.....	49.45				
Dec.......	16.54 N.			Co-sine	9·88083
	66.39	n. s.	91810		
		nat. num.	20829	log.	4·31867
True Alt.	45° 13′ 11″	=	70981		
Ref. Tab. XIV. = 58″ par. 6″ =	+ 52				
Appt. alt.	45. 14. 3				

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* This is added because intervals increase as the latitude increases

90 ***Problem.—The apparent time and the latitude and longitude of the ship being given; to find the true and apparent altitude of the Moon's centre.***

Rule.—Turn the longitude of the ship into time, and if it be west add it to, but if it be east subtract it from the apparent time at the ship, and it will give the apparent time at Greenwich. Find also the mean time at Greenwich, Art. 54.

With the apparent Greenwich time take the sun's right ascension from page I of the Nautical Almanac, and add it to the apparent time at the ship, counted from the preceding noon, which will give the right ascension of the mid-heaven. With the Greenwich mean time, take also the moon's horizontal parallax from page III, and its declination and right ascension from pages V to XII, Nautical Almanac, and take the difference between the moon's right ascension and the right ascension of the mid-heaven, which will be the distance of the moon from the meridian.

If the moon's declination and the co-latitude of the ship be one north and the other south, take their difference; but if they are both north or both south, take their sum for the moon's meridional altitude. If the sum exceed 90° take it from 180°.

With the distance of the moon from the meridian, take out the log-rising, to which add the co-sine of the ship's latitude, and the co-sine of the moon's declination; their sum, rejecting 20 from the index, will be the logarithm of a natural number, which being subtracted from the natural sine of the moon's meridional altitude, will give the natural sine of the moon's true altitude at the given time.

With the moon's horizontal parallax and her true altitude *diminished* by the difference of the numbers which stand against them in Tables XIII and XIV, take the correction of her altitude out of those tables, and subtract it from her true altitude, which will give the approximate apparent altitude of the moon's centre.

91. *Example.—What will the Moon's true and apparent altitude be at 2h. 30m. P.M., apparent time, on the 17th November,* 1844; *the latitude being* 34° 30′ *S., and the longitude* 37° 30′ *E?*

	D. H. M.		H. M. S.
Apparent given time	17. 2.30	Sun's R. A. p. I, N. A.	15.31.45
Long. 37° 30′ E. .... =	— 2.30	Apparent time at ship +	2.30. 0
Greenwich time	17. 0. 0	R. mid-heaven	18. 1.45
Equation of time	*sub.* 14.46	Moon's R. A.	22. 2.54
Greenwich mean time	16.23.45.14	Dist. of moon from mer.	4. 1. 9
4h. 1m. 9s. log-rising ..	4·70273	Moon's H. P.	57.13
Lat. .. 34°30′ S. co-sine	9·91599		
Co-lat. 55.30			
Moon's dec. 6.21 S. co-sine	9·99733		

Mer. Alt. 61.51 n. s. 88172
Nat. num. .... 41310 = 4·61605

Nat. sine .... 46862 ⇒ 27°56′42″ Moon's true Alt.
Tables XIII. XIV. .... — 49. 0 Diff. of par. in alt. and ref.

Moon's apparent altitude 27. 7.42

Examination of a Chronometer in the Downs, by the Sun's Altitude.

92. June 15th, 1844, about 6h. 58m. A. M., admit the altitude of the sun's lower limb to be 26° 50′, the eye 17 feet elevated, and quadrant adjusted: the ship's true place (by the bearings of the South Foreland and Deal Castle) latitude 51° 12′ N., and longitude 1° 27′ E. Required the longitude by a chronometer that was set to Greenwich mean time on the 10th instant, and showed 6h. 58m. 10s. at the time the altitude was observed. This chronometer having a losing rate of 2s. per day? Ther. 50°. Bar. 30 inches.

	D. H. M. S.		° ′ ″
Time by chro.	14.18.58.10	Observed alt. sun	26.50.0
Lost in five days	+ 10	Cor. XXXII. XXXIII.	+ 10.4
Greenwich mean time..	14.18.58.20	True alt.	27. 0.4

Co-lat	38.48	Co-sec.	10.203007		
Decl.	23.20	Sec.	10.037055		
Mer. alt.	62. 8	n. s.	88404		
True alt.	27. 0	n. s.	45399		
Diff. of nat. sines		....	43005	log.	4.633519
Apparent time from noon		......	5. 1.29	ris.	4.873581

	D. H. M. S.
Apparent time at ship	14.18.58.31
Equation of time	+ 6
Mean time at ship	14.18.58.37
Greenwich mean time by chro.	14.18.58.20
Error of chronometer	= 0.17

As this error may have arisen from various causes, it would be better to take more observations to confirm the result, before the rate be altered, which *appears* to be 5s. ·4 instead of 2s. losing.

Exemplification of the Improved Compass Card.

93. Let the compass course be N. b. W., the Leeway on Larboard tack three points, and variation one point and a half westerly.

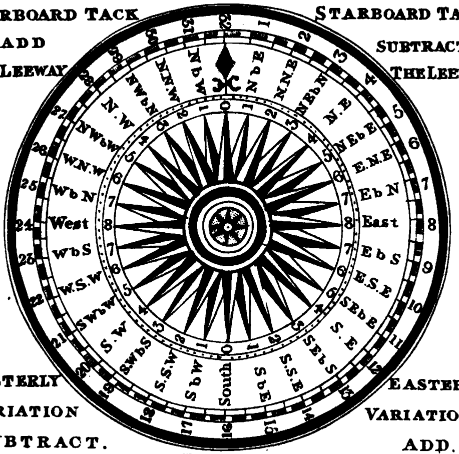
N. b. W. on the *outer* circle is		31 pts.
Leeway larboard tack	*add*	3
Variation, westerly	*sub.*	1½
Rejecting 32, shows the corrected course on the inner circle to be N. ½ E.		0½

94. Compass course N. b. E., Leeway Starboard tack one point, variation two points westerly. *Operation.* N. b. E. = 1 + 32 — 1 — 2 = 30 or N. N. W. the corrected course on the inner circle.

95. *Caution.*—On the subject of the compass, it may be useful by way of caution, to observe, that steering compasses should never be placed nearer together than two and a half feet, particularly when the ship's head is towards the East or West. It is far better to use one compass only, than to run such a risk, in the British Channel especially.

IMPROVED COMPASS CARD,

For correcting the courses steered
by the Compaſs, for
VARIATION & LEEWAY.



LARBOARD TACK
ADD
THE LEEWAY

STARBOARD TACK
SUBTRACT
THE LEEWAY

WESTERLY
VARIATION
SUBTRACT.

EASTERLY
VARIATION
ADD.

RULE. *Apply the amount of Leeway & Variation as above directed, to the number answering to the compaſs course* **ON THE OUTER CIRCLE**, *the result will be the number of the corrected course on the same circle, which being referred to the letters & inner numbers will show the name of the point & number of points from the Meridian respectively.*

∵ *If in adding the Sum should exceed 32, subtract that number from the sum. In subtracting, borrow 32 if neceſsary.*

For the Appendix to Lynn's Star Tables

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OF THE LOG. AND HALF MINUTE GLASS.

96. The knot should be the same part of a sea mile, as half a minute is of an hour; therefore the length of each knot should be $\frac{1}{120}$ of a nautical mile. The length of a nautical degree is about 69·09 English miles; and a nautical mile is 6080 feet, which divided by 120, leaves 50 feet 8 inches, the proper length of a knot in proportion to half a minute in time. But in ships that are not navigated by celestial observations, it is more safe to have the reckoning a-head of the ship; and on this account, the usual proportion is 48 feet of line, to a glass of 30 seconds.

97. *Problem.—The distance sailed by the log. and the seconds run by the glass being given; to find the true distance. The line being supposed right.*

Rule.—Multiply the distance given by the log. by 30 and divide the product by the seconds run by the glass, the quotient will be the true distance.

98. *Problem.—Given the distance sailed by the log. and the measured interval between two adjacent knots on the line; to find the true distance, the glass running exactly* 30 *seconds.*

Rule.—Multiply the distance given by the log. by the measured interval, and divide the product by 48* the quotient will be the true distance.

99. *Problem.—Given the length of a knot, the number of seconds run by the glass in half a minute, and the distance sailed by the log; to find the true distance.*

Rule.—Multiply the distance run by the log. by the length of a knot, to which annex a cypher, and divide the product by sixteen times the seconds run by the glass, the quotient will be the true distance.

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* Those who measure their knots 50 feet 8 inches, must divide thereby accordingly.

APPENDIX.

TABLES

FOR

THE USE OF MARINERS.

TABLE I.—For clearing the Apparent Distance of Celestial Objects, of the Effect of Refraction.

Gr. Alt.	Lesser Altitude.															
	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°
5°	0325	0174	0197													
6	0738	0434	0319	0319												
7	1151	0733	0508	0407	0405											
8	1548	1043	0730	0544	0464	0454										
9	1926	1356	0977	0719	0574	0503	0497									
10	2283	1661	1224	0912	0712	0588	0533	0525								
11	2617	1955	1479	1113	0866	0695	0598	0549	0536							
12	2934	2241	1723	1325	1039	0831	0697	0613	0567	0567						
13	3230	2511	1964	1536	1214	0972	0805	0689	0613	0587	0580					
14	3510	2769	2198	1741	1393	1122	0926	0783	0679	0628	0598	0593				
15	3773	3015	2423	1943	1572	1275	1054	0886	0758	0684	0631	0607	0601			
16	4022	3249	2640	2141	1748	1430	1187	0997	0847	0753	0680	0637	0613	0609		
17	4257	3472	2849	2333	1923	1585	1323	1114	0944	0832	0741	0680	0640	0615	0617	
18	4480	3684	3049	2519	2093	1739	1460	1233	1046	0917	0810	0733	0678	0643	0629	0623
19	4692	3887	3241	2699	2259	1891	1597	1354	1151	1008	0885	0794	0724	0676	0646	0630
20	4893	4081	3425	2872	2421	2039	1732	1476	1259	1101	0965	0860	0777	0716	0674	0647
21	5084	4266	3602	3039	2578	2185	1866	1597	1367	1197	1048	0931	0838	0764	0710	0672
22	5267	4443	3772	3201	2731	2328	1998	1719	1477	1296	1136	1008	0902	0819	0755	0707
23	5442	4612	3935	3358	2879	2467	2128	1839	1587	1396	1226	1087	0971	0878	0805	0748
24	5609	4775	4092	3508	3022	2602	2255	1956	1695	1495	1315	1167	1041	0939	0857	0790
25	5769	4930	4243	3653	3160	2733	2378	2071	1802	1594	1404	1248	1114	1003	0912	0837
26	5922	5080	4388	3793	3295	2861	2499	2185	1908	1692	1495	1330	1188	1069	0971	0889
27	6069	5224	4528	3928	3425	2986	2617	2297	2013	1789	1585	1413	1264	1138	1032	0943
28	6210	5362	4663	4059	3550	3106	2732	2406	2115	1886	1675	1496	1340	1207	1095	0999
29	6345	5495	4792	4185	3672	3223	2844	2512	2216	1980	1763	1578	1416	1276	1158	1056
30	6476	5623	4917	4306	3790	3336	2953	2615	2314	2073	1850	1660	1491	1346	1222	1114
31	6601	5746	5038	4424	3904	3446	3058	2717	2410	2164	1936	1740	1567	1416	1286	1173
32	6721	5864	5154	4538	4014	3553	3161	2816	2505	2254	2021	1821	1642	1486	1352	1233
33	6838	5979	5266	4647	4121	3657	3261	2912	2596	2342	2104	1899	1716	1556	1416	1293
34	6950	6089	5375	4753	4224	3757	3358	3005	2686	2427	2185	1976	1788	1623	1480	1352
35	7058	6196	5480	4856	4324	3854	3452	3096	2773	2511	2266	2052	1860	1690	1544	1412
36	7162	6298	5581	4955	4421	3948	3544	3184	2858	2593	2344	2127	1931	1759	1607	1471
37	7262	6398	5678	5050	4515	4040	3632	3270	2941	2672	2420	2200	2000	1824	1669	1529
38	7359	6493	5773	5143	4606	4128	3718	3353	3022	2750	2495	2272	2069	1889	1731	1588
39	7453	6586	5864	5233	4694	4214	3802	3435	3100	2826	2568	2342	2136	1953	1791	1646
40	7543	6675	5952	5320	4779	4297	3883	3514	3177	2900	2639	2410	2202	2017	1851	1702
41	7630	6762	6037	5404	4862	4378	3962	3590	3251	2972	2709	2477	2266	2078	1910	1758
42	7715	6846	6120	5485	4942	4456	4038	3665	3323	3042	2777	2542	2329	2138	1968	1813
43	7796	6926	6200	5563	5018	4532	4112	3737	3394	3111	2843	2606	2390	2197	2024	1867
44	7875	7004	6277	5639	5093	4605	4184	3807	3463	3177	2907	2669	2450	2255	2080	1921
45	7951	7079	6351	5713	5166	4676	4254	3874	3528	3241	2969	2729	2508	2311	2133	1973
46	8024	7152	6423	5784	5236	4745	4321	3940	3592	3303	3030	2787	2565	2365	2185	2023
47	8095	7223	6493	5853	5304	4812	4386	4004	3654	3364	3089	2844	2620	2419	2237	2072
48	8164	7291	6560	5919	5368	4876	4449	4066	3715	3423	3146	2900	2674	2471	2287	2120
49	8230	7356	6625	5983	5432	4938	4511	4126	3773	3480	3202	2954	2727	2522	2337	2167
50	8294	7420	6688	6045	5494	4999	4570	4185	3831	3536	3256	3008	2778	2572	2385	2214
51	8356	7481	6749	6106	5553	5057	4628	4241	3886	3590	3309	3059	2828	2620	2432	2260
52	8415	7540	6807	6164	5610	5113	4683	4295	3939	3642	3360	3108	2876	2666	2477	2303
53	8473	7597	6864	6220	5666	5168	4737	4348	3991	3693	3409	3156	2923	2712	2521	2346
54	8529	7652	6919	6274	5719	5220	4788	4399	4040	3741	3457	3203	2968	2756	2564	2388
55	8582	7706	6972	6326	5771	5272	4839	4449	4089	3789	3504	3249	3013	2800	2607	2429
56	8634	7757	7022	6376	5820	5321	4887	4496	4136	3835	3549	3293	3056	2842	2647	2468
57	8683	7806	7071	6425	5868	5368	4934	4542	4181	3879	3592	3335	3097	2881	2686	2506
58	8731	7854	7119	6472	5914	5414	4979	4586	4224	3922	3634	3376	3137	2920	2724	2543
59	8777	7900	7164	6517	5959	5458	5022	4629	4266	3963	3674	3415	3176	2958	2761	2578
60	8821	7944	7208	6560	6001	5500	5064	4670	4306	4003	3712	3453	3213	2994	2796	2612

N. B. Throughout this Table (I) whenever the Logarithms fall on the right of the *black waving line;* or if both Altitudes exceed 50° the effect of *Refraction* may be had at once by Table III. In fair weather, when the observer has the option to do so, either of these cases will make this short method still shorter in computation.

TABLE I.—For clearing the Apparent Distance of Celestial Objects, of the Effect of Refraction.

Lesser Altitude.

Gr. Alt.	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°
19°	0625															
20	0631	0627														
21	0646	0632	0627													
22	0672	0648	0635	0634												
23	0703	0671	0644	0641	0640											
24	0737	0697	0667	0651	0642	0639										
25	0776	0728	0691	0667	0653	0642	0638									
26	0820	0764	0720	0690	0669	0652	0642	0640								
27	0867	0805	0754	0717	0690	0667	0652	0644	0643							
28	0917	0848	0790	0748	0715	0686	0665	0653	0647	0645						
29	0968	0893	0830	0782	0743	0709	0683	0665	0655	0649	0647					
30	1020	0939	0870	0817	0773	0734	0703	0681	0666	0654	0649	0646				
31	1073	0987	0914	0855	0807	0762	0727	0700	0680	0665	0655	0649	0648			
32	1129	1038	0960	0896	0843	0794	0754	0723	0697	0681	0667	0655	0652	0653		
33	1184	1088	1005	0938	0880	0827	0782	0747	0717	0698	0679	0664	0657	0655	0654	
34	1238	1138	1050	0978	0917	0859	0811	0772	0740	0717	0693	0676	0664	0658	0654	0650
35	1294	1190	1098	1022	0957	0895	0843	0800	0765	0737	0711	0690	0675	0667	0659	0653
36	1350	1241	1146	1066	0997	0932	0875	0829	0791	0758	0730	0706	0688	0677	0666	0657
37	1404	1292	1192	1110	1037	0968	0909	0859	0817	0781	0750	0723	0702	0688	0675	0663
38	1459	1344	1241	1155	1078	1006	0944	0891	0846	0806	0773	0743	0719	0702	0686	0672
39	1514	1395	1289	1199	1120	1045	0979	0923	0875	0833	0796	0764	0737	0718	0700	0683
40	1567	1447	1337	1244	1162	1083	1015	0956	0904	0860	0821	0786	0757	0735	0714	0695
41	1620	1496	1384	1288	1203	1122	1051	0989	0935	0888	0846	0808	0777	0753	0730	0708
42	1673	1545	1431	1332	1245	1161	1087	1023	0967	0916	0872	0832	0798	0772	0746	0723
43	1724	1594	1477	1377	1286	1200	1123	1057	0998	0946	0899	0857	0820	0792	0763	0739
44	1775	1643	1523	1420	1326	1239	1159	1090	1029	0975	0927	0881	0842	0811	0781	0756
45	1824	1689	1567	1461	1366	1276	1194	1123	1059	1002	0955	0905	0864	0831	0799	0772
46	1872	1735	1611	1503	1406	1313	1229	1156	1090	1031	0982	0929	0887	0852	0819	0788
47	1920	1781	1655	1545	1446	1350	1265	1189	1122	1061	1010	0954	0911	0874	0839	0806
48	1966	1825	1697	1585	1484	1387	1299	1222	1153	1090	1037	0980	0934	0896	0859	0824
49	2012	1869	1738	1625	1523	1424	1334	1255	1184	1119	1065	1006	0958	0919	0880	0844
50	2057	1913	1781	1665	1561	1460	1369	1288	1216	1149	1092	1033	0982	0942	0902	0864
51	2100	1955	1821	1705	1598	1495	1403	1320	1246	1178	1119	1059	1007	0964	0924	0883
52	2142	1995	1860	1743	1634	1530	1435	1351	1275	1205	1144	1084	1031	0986	0944	0902
53	2184	2035	1899	1779	1669	1564	1468	1382	1305	1234	1169	1108	1055	1009	0964	0920
54	2225	2074	1937	1815	1704	1598	1500	1413	1334	1262	1194	1133	1079	1032	0985	0940
55	2265	2113	1974	1851	1740	1631	1532	1443	1364	1290	1220	1159	1104	1055	1007	0961
56	2302	2150	2009	1886	1774	1663	1563	1473	1392	1317	1247	1184	1127	1077	1028	0981
57	2339	2185	2043	1919	1807	1693	1592	1501	1418	1342	1273	1207	1148	1098	1049	1001
58	2375	2220	2077	1951	1838	1723	1621	1529	1446	1368	1298	1230	1171	1119	1069	1020
59	2409	2253	2109	1982	1868	1753	1649	1556	1471	1393	1321	1253	1193	1140	1088	1039
60	2442	2285	2140	2012	1896	1781	1675	1582	1496	1418	1343	1275	1213	1160	1107	1057
61	2475	2317	2171	2042	1924	1809	1703	1608	1521	1441	1367	1297	1234	1180	1126	1075
62	2507	2348	2201	2071	1952	1836	1729	1633	1546	1464	1389	1319	1255	1200	1146	1093
63	2537	2377	2229	2098	1978	1861	1754	1657	1569	1486	1411	1339	1275	1218	1163	1110
64	2565	2405	2256	2124	2003	1885	1778	1680	1590	1507	1432	1359	1294	1235	1180	1127
65	2592	2432	2283	2150	2028	1909	1801	1703	1611	1529	1452	1378	1312	1252	1196	1143
66	2619	2457	2307	2174	2051	1932	1822	1724	1631	1549	1471	1396	1330	1269	1211	1157
67	2645	2482	2331	2197	2074	1954	1843	1744	1651	1569	1489	1413	1347	1285	1227	1171
68	2669	2505	2354	2220	2096	1975	1863	1764	1670	1588	1507	1430	1364	1301	1243	1185
69	2692	2528	2376	2243	2117	1996	1882	1784	1688	1607	1525	1447	1381	1317	1259	1199
70	2714	2550	2397	2265	2138	2015	1899	1803	1707	1625	1542	1463	1396	1332	1274	1213
71	2735	2569	2415	2286	2156	2033	1915	1822	1725	1643	1560	1479	1411	1347	1289	1227
72	2754	2587	2433	2306	2172	2051	1932	1839	1742	1659	1576	1495	1426	1362	1304	1241
73	2772	2605	2452	2324	2187	2068	1949	1855	1758	1674	1591	1510	1440	1376	1318	1254
74	2790	2623	2469	2341	2203	2084	1965	1870	1773	1689	1606	1525	1454	1390	1332	1267

See N.B. in opposite page

TABLE I.—For clearing the Apparent Distance of Celestial Objects, of the Effect of Refraction.

Gr. Alt.	Lesser Altitude.															
	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°
35°	0653															
36	0655	0654														
37	0658	0654	0652													
38	0665	0659	0655	0654												
39	0673	0665	0659	0656	0655											
40	0682	0672	0664	0659	0656	0656										
41	0694	0681	0670	0664	0659	0657	0656									
42	0706	0692	0679	0670	0664	0660	0657	0657								
43	0720	0704	0689	0679	0671	0665	0661	0659	0659							
44	0734	0716	0699	0688	0679	0672	0666	0662	0661	0661						
45	0748	0728	0709	0697	0687	0679	0672	0666	0663	0662	0662					
46	0764	0741	0720	0707	0995	0686	0678	0671	0667	0665	0663	0663				
47	0780	0755	0732	0718	0704	0694	0685	0676	0671	0668	0665	0663	0662			
48	0797	0770	0746	0730	0714	0703	0693	0682	0676	0672	0667	0664	0662	0661		
49	0814	0787	0762	0743	0725	0713	0702	0689	0682	0677	0672	0667	0664	0662	0661	
50	0833	0804	0778	0757	0737	0724	0712	0698	0689	0683	0678	0672	0668	0665	0663	0662
51	0851	0821	0793	0771	0750	0736	0723	0708	0697	0690	0684	0677	0672	0668	0665	0664
52	0869	0838	0808	0785	0763	0748	0734	0718	0705	0697	0690	0682	0676	0671	0667	0665
53	0887	0855	0824	0799	0777	0761	0746	0729	0714	0704	0696	0687	0680	0674	0669	0666
54	0905	0872	0840	0814	0792	0775	0759	0741	0724	0712	0703	0692	0684	0677	0671	0667
55	0924	0890	0858	0830	0807	0789	0772	0753	0735	0721	0711	0698	0689	0681	0674	0669
56	0943	0908	0875	0845	0822	0803	0785	0765	0746	0730	0719	0704	0694	0685	0677	0672
57	0962	0925	0890	0860	0837	0817	0797	0777	0757	0740	0727	0710	0699	0689	0681	0675
58	0980	0942	0906	0875	0852	0831	0809	0789	0769	0751	0736	0717	0706	0695	0686	0680
59	0998	0959	0922	0890	0867	0845	0822	0801	0780	0761	0745	0724	0713	0701	0692	0685
60	1015	0975	0939	0904	0878	0858	0835	0813	0791	0771	0754	0731	0718	0705	0696	0689
61	1032	0992	0954	0919	0892	0871	0848	0825	0802	0781	0763	0739	0726	0712	0702	0694
62	1049	1008	0968	0934	0906	0884	0861	0837	0813	0791	0772	0747	0734	0719	0708	0699
63	1065	1023	0983	0948	0920	0897	0873	0848	0824	0801	0781	0755	0741	0726	0714	0704
64	1081	1037	0997	0962	0934	0910	0885	0859	0835	0811	0790	0763	0748	0733	0720	0709
65	1096	1051	1010	0976	0947	0922	0897	0870	0845	0820	0798	0771	0755	0739	0726	0714
66	1110	1064	1022	0989	0960	0934	0908	0880	0855	0829	0806	0779	0762	0746	0732	0719
67	1124	1078	1035	1002	0973	0946	0919	0890	0865	0838	0814	0787	0769	0753	0738	0724
68	1137	1091	1047	1014	0985	0957	0930	0900	0874	0846	0821	0794	0776	0759	0744	0729
69	1150	1104	1060	1027	0997	0968	0941	0910	0883	0854	0828	0801	0783	0765	0749	0733
70	1163	1118	1073	1040	1009	0979	0952	0921	0893	0863	0836	0809	0790	0771	0754	0737
71	1176	1131	1086	1053	1021	0990	0963	0932	0903	0872	0844	0816	0797	0777	0759	0741
72	1190	1145	1100	1066	1034	1001	0974	0943	0913	0881	0852	0823	0804	0783	0764	0745
73	1204	1159	1114	1079	1046	1012	0985	0953	0922	0889	0859	0830	0810	0789	0769	0750
74	1217	1172	1127	1091	1058	1024	0996	0963	0931	0897	0866	0837	0816	0795	0774	0755
75	1230	1185	1140	1103	1070	1036	1007	0973	0940	0905	0873	0844	0822	0800	0778	0758
76	1242	1197	1152	1114	1081	1047	1017	0983	0949	0913	0880	0850	0828	0806	0783	0762
77	1252	1207	1162	1124	1091	1057	1027	0992	0958	0921	0887	0856	0834	0811	0787	0766
78	1261	1216	1171	1133	1099	1065	1035	1000	0966	0928	0894	0862	0840	0817	0792	0770
79	1269	1224	1179	1141	1106	1072	1042	1007	0973	0935	0900	0868	0846	0823	0797	0775
80	1276	1231	1186	1148	1113	1079	1048	1013	0979	0941	0905	0873	0851	0827	0801	0779
81	1283	1238	1193	1154	1119	1085	1054	1019	0985	0946	0910	0878	0856	0832	0806	0783
82	1289	1244	1199	1160	1125	1091	1060	1025	0991	0951	0915	0883	0860	0836	0810	0787
83	1295	1250	1205	1165	1130	1096	1064	1029	0995	0955	0919	0887	0864	0840	0813	0790
84	1300	1255	1210	1170	1135	1101	1068	1033	0999	0959	0923	0891	0868	0844	0816	0793
85	1304	1259	1214	1174	1139	1105	1071	1036	1002	0962	0926	0894	0871	0847	0818	0795
86	1307	1262	1217	1177	1142	1108	1073	1038	1004	0964	0928	0896	0873	0849	0820	0796
87	1308	1263	1218	1178	1143	1109	1074	1039	1005	0965	0929	0897	0874	0850	0821	0797
88	1309	1264	1219	1179	1144	1110	1075	1040	1006	0966	0930	0897	0874	0850	0821	0797
89	1309	1264	1219	1179	1144	1110	1075	1040	1006	0966	0930	0897	0874	0850	0821	0797
90	1309	1264	1219	1179	1144	1110	1075	1040	1006	0966	0930	0897	0874	0850	0821	0797

See N.B. page 2.

TABLE I. — For clearing the Apparent Distance of Celestial Objects, of the Effect of Refraction.

Lesser Altitude.

Gr. Alt.	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15	16°	17°	18°
61°	8864	7986	7250	6601	6042	5541	5104	4709	4345	4041	3750	3490	3249	3029	2830	2646
62	8905	8026	7290	6641	6082	5580	5143	4748	4383	4078	3786	3525	3284	3063	2863	2678
63	8944	8065	7328	6680	6120	5617	5180	4784	4419	4113	3821	3559	3317	3096	2895	2709
64	8981	8102	7565	6716	6156	5653	5215	4819	4453	4147	3854	3591	3348	3128	2925	2740
65	9017	8138	7401	6751	6191	5687	5249	4853	4486	4180	3886	3623	3379	3157	2955	2769
66	9051	8172	7435	6785	6224	5720	5281	4884	4517	4210	3916	3652	3408	3185	2982	2795
67	9084	8205	7467	6817	6256	5752	5312	4915	4548	4240	3945	3681	3436	3212	3009	2820
68	9115	8236	7498	6848	6286	5781	5342	4944	4576	4268	3973	3708	3463	3238	3034	2845
69	9145	8265	7527	6877	6315	5810	5370	4972	4604	4296	4000	3735	3488	3263	3059	2870
70	9173	8293	7555	6904	6342	5837	5397	4998	4630	4321	4025	3759	3511	3288	3082	2892
71	9199	8319	7581	6930	6368	5862	5421	5022	4653	4344	4047	3781	3533	3311	3103	2912
72	9225	8345	7606	6955	6392	5886	5445	5046	4677	4367	4070	3803	3555	3332	3123	2932
73	9248	8368	7629	6978	6415	5909	5468	5068	4699	4389	4091	3824	3576	3352	3143	2951
74	9271	8390	7651	7000	6437	5931	5489	5089	4720	4409	4111	3844	3596	3370	3161	2969
75	9292	8411	7672	7020	6457	5951	5509	5109	4739	4428	4130	3862	3614	3386	3179	2986
76	9311	8430	7691	7039	6476	5970	5528	5127	4757	4446	4148	3879	3630	3402	3194	3002
77	9329	8448	7709	7057	6494	5987	5545	5145	4774	4463	4164	3896	3646	3418	3210	3018
78	9346	8465	7726	7074	6510	6003	5561	5160	4789	4478	4179	3911	3661	3433	3224	3031
79	9361	8480	7741	7089	6525	6018	5575	5174	4803	4491	4192	3924	3674	3446	3236	3042
80	9375	8494	7755	7102	6539	6031	5589	5188	4817	4504	4206	3937	3686	3458	3249	3055
81	9388	8507	7767	7115	6551	6044	5601	5200	4829	4517	4218	3949	3698	3470	3259	3065
82	9399	8518	7778	7126	6562	6055	5612	5211	4840	4528	4229	3960	3709	3480	3268	3074
83	9409	8528	7788	7135	6572	6064	5621	5220	4849	4536	4237	3968	3717	3488	3277	3083
84	9417	8536	7796	7144	6580	6073	5630	5228	4857	4544	4245	3975	3724	3496	3285	3091
85	9425	8544	7804	7152	6587	6080	5637	5236	4864	4552	4252	3983	3732	3503	3292	3098
86	9431	8550	7810	7158	6594	6086	5644	5242	4871	4558	4259	3989	3739	3509	3298	3104
87	9436	8555	7815	7162	6598	6091	5649	5246	4876	4561	4262	3992	3742	3512	3301	3107
88	9438	8557	7817	7164	6600	6093	5650	5246	4876	4561	4262	3992	3742	3514	3303	3109
89	9440	8559	7819	7166	6602	6094	5651	5248	4876	4562	4263	3993	3742	3514	3303	3109
90	9441	8560	7820	7167	6603	6095	5651	5249	4877	4563	4263	3993	3742	3514	3303	3109

Gr. Alt.	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°
75°	2807	2639	2485	2356	2218	2098	1979	1883	1787	1702	1620	1539	1467	1403	1345	1280
76	2823	2654	2500	2371	2231	2113	1992	1895	1799	1714	1632	1551	1479	1415	1357	1292
77	2838	2669	2515	2386	2245	2127	2005	1907	1811	1726	1644	1562	1490	1426	1368	1302
78	2851	2682	2528	2399	2258	2140	2017	1918	1822	1737	1655	1572	1500	1436	1378	1311
79	2863	2694	2540	2410	2269	2151	2028	1928	1832	1747	1665	1581	1509	1445	1387	1319
80	2874	2705	2552	2421	2280	2161	2039	1937	1841	1757	1674	1589	1517	1453	1395	1326
81	2884	2714	2563	2432	2290	2170	2050	1945	1849	1765	1682	1597	1525	1461	1402	1333
82	2893	2722	2572	2441	2300	2178	2060	1952	1856	1772	1689	1604	1532	1468	1409	1339
83	2901	2730	2580	2449	2308	2185	2069	1959	1863	1779	1696	1611	1539	1475	1415	1345
84	2908	2738	2588	2457	2316	2192	2077	1965	1869	1785	1702	1617	1545	1481	1420	1350
85	2915	2745	2595	2464	2323	2198	2083	1971	1874	1791	1707	1622	1550	1486	1425	1354
86	2921	2749	2599	2468	2327	2202	2087	1976	1878	1795	1711	1626	1554	1490	1428	1357
87	2925	2751	2601	2470	2329	2204	2089	1978	1880	1797	1713	1628	1556	1492	1429	1359
88	2927	2753	2603	2472	2331	2205	2090	1979	1881	1799	1714	1629	1557	1493	1430	1360
89	2927	2753	2603	2472	2331	2205	2090	1979	1881	1799	1714	1629	1557	1493	1430	1360
90	2928	2753	2603	2472	2331	2205	2090	1979	1881	1799	1714	1629	1557	1493	1430	1360

TABLE II.—For clearing the Apparent Distance of the Effect of Refraction. To be used conjointly with Table I.

In computing the Effect of Refraction, when the Distance is less than 90°, subtract the number of seconds answering thereto, and to the lesser altitude in this Table, from the seconds deduced from Table I.; but if the Distance be more than 90°, add them together.

Distance.	Lesser Altitude.						Distance.	Lesser Altitude.						Distance.
	3°	4°	5°	6°	8°	10° and above.		3°	4°	5°	6°	8°	10° and above	
°	″	″	″	″	″	″	°	′	″	″	″	″	″	°
10	590	612	626	635	644	650	50	87	91	93	94	95	96	
11	535	555	568	576	584	589	51	84	87	89	91	92	92	
12	489	508	519	527	535	539	52	81	84	86	87	89	89	
13	450	467	478	485	492	496	53	78	81	83	84	86	86	
14	417	433	443	449	456	459	54	76	78	80	81	83	83	
15	388	403	412	418	424	427	55	73	76	77	78	80	80	
16	363	376	385	390	396	399	56	70	73	75	75	77	77	
17	340	353	361	366	372	375	57	68	70	72	73	74	74	
18	320	332	340	344	350	352	58	65	67	69	70	71	72	
19	302	313	321	325	330	333	59	62	65	66	67	68	69	
20	286	296	303	307	312	315	60	60	62	64	65	66	66	120
21	271	281	288	292	296	298	61	58	60	61	62	63	63	119
22	257	267	273	277	281	283	62	55	57	59	60	60	61	118
23	245	254	260	264	268	270	63	53	55	56	57	58	58	117
24	233	242	248	251	255	257	64	51	53	54	55	55	56	116
25	223	231	237	240	244	246	65	49	50	52	52	53	53	115
26	213	221	226	229	233	235	66	46	48	49	50	51	51	114
27	204	212	217	220	223	225	67	44	46	47	48	48	49	113
28	196	203	208	210	214	215	68	42	44	45	45	46	46	112
29	188	195	199	202	205	207	69	40	41	42	43	44	44	111
30	180	187	191	194	197	198	70	38	39	40	41	41	42	110
31	173	180	184	186	189	191	71	36	37	38	39	39	39	109
32	166	173	177	179	182	183	72	34	35	36	36	37	37	108
33	160	166	170	172	175	176	73	32	33	34	34	35	35	107
34	154	160	164	166	168	170	74	30	31	32	32	33	33	106
35	148	154	158	160	162	164	75	28	29	30	30	30	31	105
36	143	148	152	154	156	158	76	26	27	28	28	28	29	104
37	138	143	147	149	151	152	77	24	25	26	26	26	26	103
38	133	138	141	143	145	147	78	22	23	24	24	24	24	102
39	128	133	136	138	140	141	79	20	21	22	22	22	22	101
40	124	129	132	133	135	136	80	18	19	20	20	20	20	100
41	120	124	127	129	131	132	81	17	17	18	18	18	18	99
42	115	120	123	124	126	127	82	15	15	16	16	16	16	98
43	111	116	118	120	122	123	83	13	13	14	14	14	14	97
44	108	112	114	116	118	119	84	11	11	12	12	12	12	96
45	104	108	110	112	114	115	85	9	9	10	10	10	10	95
46	100	104	107	108	110	111	86	7	8	8	8	8	8	94
47	97	101	103	104	106	107	87	5	6	6	6	6	6	93
48	94	97	99	101	102	103	88	4	4	4	4	4	4	92
49	90	94	96	97	99	100	89	2	2	2	2	2	2	91
							90	0	0	0	0	0	0	90

TABLE III.
FOR REFRACTION.

In any case falling to the right or above the black waving line in Table I., or when both altitudes exceed 50 deg., the Effect of Refraction is had at once from this Table in any climate.

Add to Apparent Distance.

Dist.	Refr.	Dist.	Refrac.
°	″	°	″
10	10		
11	11	66	75
12	12	67	77
13	13	68	78
14	14	69	80
15	15	70	81
16	16	71	83
17	17	72	84
18	18	73	86
19	19	74	88
20	20	75	89
21	22	76	91
22	23	77	92
23	24	78	94
24	25	79	96
25	26	80	98
26	27	81	99
27	28	82	101
28	29	83	103
29	30	84	105
30	31	85	106
31	32	86	108
32	33	87	110
33	34	88	112
34	36	89	114
35	37	90	116
36	38	91	118
37	39	92	121
38	40	93	122
39	41	94	125
40	42	95	127
41	43	96	129
42	45	97	131
43	46	98	134
44	47	99	136
45	48	100	138
46	49	101	141
47	51	102	143
48	52	103	146
49	53	104	149
50	54	105	151
51	55	106	154
52	57	107	157
53	58	108	160
54	59	109	163
55	60	110	166
56	62	111	169
57	63	112	172
58	64	113	176
59	66	114	179
60	67	115	182
61	68	116	186
62	70	117	190
63	71	118	193
64	73	119	197
65	74	120	201

TABLE IV.—For the Effect of Parallax on the Moon's Distance from the Sun or Star.

Add the Difference of the two numbers taken from this Table, if the Apparent Distance is less than 90°, and subtract it if above 90°

Parallax in Altitude or Distance.	Apparent Distance.														
	20°	21°	22°	23°	24°	25°	26°	28°	30°	32°	34°	36°	38°	40°	42°
′	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
12	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1
14	5	4	4	4	4	4	4	3	3	3	2	2	2	2	2
16	6	6	6	5	5	5	5	5	4	4	3	3	2	2	2
18	8	7	7	6	6	6	6	6	5	5	4	4	3	3	3
20	9	9	9	8	8	7	7	7	6	6	5	5	4	4	4
22	12	11	11	10	10	9	9	8	7	7	6	6	5	5	5
24	14	13	12	11	11	10	10	9	9	8	7	7	6	6	6
26	16	15	14	13	13	12	12	11	10	9	9	8	7	7	7
28	19	18	17	16	15	14	14	13	12	11	10	9	8	8	8
30	21	20	19	18	17	16	16	15	14	13	12	11	10	9	9
32	24	23	22	21	20	19	18	17	16	15	14	12	11	10	10
34	27	25	24	23	22	21	21	19	18	17	15	14	13	11	11
36	31	29	27	26	25	24	23	21	20	18	17	15	14	13	12
38	34	32	31	29	28	27	26	23	22	20	19	17	16	14	13
40	38	36	34	32	31	30	29	26	24	22	21	19	18	16	15
42	42	40	38	36	35	33	32	29	27	25	23	21	20	18	17
44	46	43	41	39	38	36	35	32	29	27	25	23	22	19	18
46	51	48	45	43	42	40	38	35	32	29	27	25	24	21	19
48	55	52	50	47	45	43	42	38	35	32	30	28	26	23	22
50	60	57	54	51	48	46	45	41	38	35	32	30	28	26	25
52	65	61	58	55	53	51	49	45	41	38	35	32	30	28	26
54	70	66	63	60	57	54	52	48	44	41	38	35	32	30	28
56	75	71	68	65	62	59	56	51	47	44	41	38	35	32	30
58	80	76	73	69	66	63	60	55	51	47	44	40	37	35	32
60	86	82	78	74	70	67	64	59	54	50	47	43	40	37	34
62	92	87	83	79	75	72	69	63	58	54	50	46	43	40	36

Parallax in Altitude or Distance.	44°	46°	48°	50°	52°	54°	56°	58°	60° 120	65° 115	70° 110	75° 105	80° 100	85° 95	90° 90
′	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
12	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
14	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0
16	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0
18	3	3	2	2	2	2	2	2	2	1	1	0	0	0	0
20	3	3	3	3	3	2	2	2	2	1	1	1	0	0	0
22	4	4	3	3	3	3	3	2	2	2	1	1	0	0	0
24	5	5	4	4	4	3	3	3	3	2	1	1	1	0	0
26	6	6	5	5	5	4	4	3	3	3	2	1	1	0	0
28	7	7	6	6	6	5	5	4	4	3	2	2	1	0	0
30	8	8	7	6	6	5	5	4	4	4	3	2	1	0	0
32	9	9	8	7	6	5	5	5	5	4	3	2	1	0	0
34	10	10	9	8	7	6	6	5	5	4	4	2	1	0	0
36	11	11	10	9	8	7	7	6	6	5	4	3	2	1	0
38	12	12	11	11	10	9	9	8	7	5	4	3	2	1	0
40	14	14	13	12	11	10	9	8	8	6	5	3	2	1	0
42	15	15	14	13	12	11	10	9	9	7	5	4	2	1	0
44	16	16	14	13	12	11	11	10	9	7	6	4	2	1	0
46	18	17	15	14	13	12	12	11	10	8	7	5	3	1	0
48	21	19	17	16	15	13	12	12	11	9	7	5	3	2	0
50	23	21	19	18	17	15	14	13	12	10	8	6	4	2	0
52	24	22	20	19	17	16	15	14	13	10	8	6	4	2	0
54	26	24	22	20	19	17	16	15	14	11	9	7	4	2	0
56	28	26	24	22	20	18	17	16	15	12	9	7	5	2	0
58	30	28	26	24	22	20	19	17	16	13	10	7	5	2	0
60	32	30	28	26	24	22	21	19	18	14	11	8	5	3	0
62	34	32	30	28	26	24	22	20	19	16	12	9	6	3	0

TABLE V.—SUPPLEMENTARY. For the Effect of the Sun's Parallax.

Subtract from Apparent Distance.

Argument.—Apparent Distance of the Sun and Moon.

☽ Alt.	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
5°	2″	1″	1″	1″	1″	1″	1″	1″	1″	1″	1″	1″	1″
10	3	3	2	2	2	2	2	2	2	2	2	2	2
15	5	4	4	3	3	3	3	3	2	2	2	2	2
20	6	5	5	4	4	4	3	3	3	3	3	3	3
25	7	6	6	5	5	5	4	4	4	4	4	4	4
30	9	8	7	6	6	5	5	5	5	4	4	4	4
35	10	9	8	7	7	6	6	6	5	5	5	5	5
40	11	10	9	8	7	7	6	6	6	6	6	6	6
45	12	11	10	9	8	8	7	7	7	6	6	6	6
50	13	12	10	10	9	8	8	7	7	7	7	7	7
55	14	13	11	10	9	9	8	8	8	8	7	7	7
60	15	13	12	11	10	9	9	8	8	8	8	8	8
65	16	14	12	11	10	10	9	9	8	8	8	8	8
70	17	15	13	12	11	10	10	9	9	9	9	8	8
75	17	15	13	12	11	10	10	9	9	9	9	9	8
80	17	15	13	12	11	11	10	10	9	9	9	9	9
85	18	16	14	12	11	11	10	10	9	9	9	9	9
90	18	16	14	12	11	11	10	10	9	9	9	9	9
							120°	115°	110°	105°	100°	95°	90°

Apparent Distance of the Sun and Moon.

Subtract from Apparent Distance.

The joint Effect of Tables V. and VI. cannot exceed 9″

TAB. VI.—SUPPLEMENTᵞ. For the Effect of the Sun's Parallax.

Add to Apparent Distance.

Argument.—Apparent Distance of the Sun and Moon.

⊙ Alt.	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
5°	1″	1″	1″	1″	1″	0″	0″	0″	0″	0″	0″	0″	0″
10	3	2	2	2	1	1	1	1	1	0	0	0	0
15	4	3	3	2	2	2	1	1	1	0	0	0	0
20	5	4	4	3	2	2	2	1	1	1	0	0	0
25	6	5	4	4	3	2	2	2	1	1	1	0	0
30	8	6	5	4	4	3	2	2	2	1	1	0	0
35	9	7	6	5	4	3	3	2	2	1	1	0	0
40	10	8	7	6	5	4	3	3	2	2	1	0	0
45	11	9	7	6	5	4	4	3	2	2	1	1	0
50	12	10	8	7	6	5	4	3	2	2	1	1	0
55	13	10	8	7	6	5	4	3	3	2	1	1	0
60	13	11	9	8	6	5	4	4	3	2	1	1	0
65	14	11	9	8	7	6	5	4	3	2	1	1	0
70	14	12	10	8	7	6	5	4	3	2	1	1	0
75	15	12	10	8	7	6	5	4	3	2	2	1	0
80	15	13	10	9	7	6	5	4	3	2	2	1	0
85	15	13	10	9	7	6	5	4	3	2	2	1	0
90	15	13	11	9	7	6	5	4	3	2	2	1	0
							120°	115°	110°	105°	100°	95°	90°

Apparent Distance of the Sun and Moon.

Subtract from Apparent Distance.

TABLE VII.—Proportional Parts for Minutes of Altitude, for Table I.

M	10	20	30	40	50	60	70	80	90	100	200	300	400	500
1	0	0	1	1	1	1	1	1	2	2	3	5	7	8
2	0	1	1	1	2	2	2	3	3	3	7	10	13	17
3	1	1	2	2	3	3	4	4	5	5	10	15	20	25
4	1	1	2	3	3	4	5	5	6	7	13	20	27	33
5	1	2	3	3	4	5	6	7	8	8	17	25	33	42
6	1	2	3	4	5	6	7	8	9	10	20	30	40	50
7	1	2	4	5	6	7	8	9	11	12	23	35	47	58
8	1	3	4	5	7	8	9	11	12	13	27	40	53	67
9	2	3	5	6	8	9	11	12	14	15	30	45	60	75
10	2	3	5	7	8	10	12	13	15	17	33	50	67	83
11	2	4	6	7	9	11	13	15	17	18	37	55	73	92
12	2	4	6	8	10	12	14	16	18	20	40	60	80	100
13	2	4	7	9	11	13	15	17	20	22	43	65	87	108
14	2	5	7	9	12	14	16	19	21	23	47	70	93	117
15	3	5	8	10	13	15	18	20	23	25	50	75	100	125
16	3	5	8	11	13	16	19	21	24	27	53	80	107	133
17	3	6	9	11	14	17	20	23	26	28	57	85	113	142
18	3	6	9	12	15	18	21	24	27	30	60	90	120	150
19	3	6	10	13	16	19	22	25	29	32	63	95	127	158
20	3	7	10	13	17	20	23	27	30	33	67	100	133	167
21	4	7	11	14	18	21	25	28	32	35	70	105	140	175
22	4	7	11	15	18	22	26	29	33	37	73	110	147	183
23	4	8	12	15	19	23	27	31	35	38	77	115	153	192
24	4	8	12	16	20	24	28	32	36	40	80	120	160	200
25	4	8	13	17	21	25	29	33	38	42	83	125	167	208
26	4	9	13	17	22	26	30	35	39	43	87	130	173	217
27	5	9	14	18	23	27	32	36	41	45	90	135	180	225
28	5	9	14	19	23	28	33	37	42	47	93	140	187	233
29	5	10	15	19	24	29	34	39	44	48	97	145	193	242
30	5	10	15	20	25	30	35	40	45	50	100	150	200	250
31	5	10	16	21	26	31	36	41	47	52	103	155	207	258
32	5	11	16	21	27	32	37	43	48	53	107	160	213	267
33	6	11	17	22	28	33	39	44	50	55	110	165	220	275
34	6	11	17	23	28	34	40	45	51	57	113	170	227	283
35	6	12	18	23	29	35	41	47	53	58	117	175	233	292
36	6	12	18	24	30	36	42	48	54	60	120	180	240	300
37	6	12	19	25	31	37	43	49	56	62	123	185	247	308
38	6	13	19	25	32	38	44	51	57	63	127	190	253	317
39	7	13	20	26	33	39	46	52	59	65	130	195	260	325
40	7	13	20	27	33	40	47	53	60	67	133	200	267	333
41	7	14	21	27	34	41	48	55	62	68	137	205	273	342
42	7	14	21	28	35	42	49	56	63	70	140	210	280	350
43	7	14	22	29	36	43	50	57	65	72	143	215	287	358
44	7	15	22	29	37	44	51	59	66	73	147	220	290	367
45	8	15	23	30	38	45	53	60	68	75	150	225	300	375
46	8	15	23	31	38	46	54	61	69	77	153	230	307	383
47	8	16	24	31	39	47	55	63	71	78	157	235	313	390
48	8	16	24	32	40	48	56	64	72	80	160	240	320	400
49	8	16	25	33	41	49	57	65	74	82	163	245	327	408
50	8	17	25	33	42	50	58	67	75	83	167	250	333	417
51	9	17	26	34	43	51	60	68	77	85	170	255	340	425
52	9	17	26	35	43	52	61	69	78	87	173	260	347	433
53	9	18	27	35	44	53	62	71	80	88	177	265	353	442
54	9	18	27	36	45	54	63	72	81	90	180	270	360	450
55	9	18	28	37	46	55	64	73	83	92	183	275	367	458
56	9	19	28	37	47	56	65	75	84	93	187	280	373	467
57	10	19	29	38	48	57	67	76	86	95	190	285	380	475
58	10	19	29	39	48	58	68	77	87	97	193	290	387	483
59	10	20	30	39	49	59	69	79	89	98	197	295	393	492
60	10	20	30	40	50	60	70	80	90	100	200	300	400	500

TABLE VIII.—For Finding the Latitude by the Meridian Altitude of the Moon.

Obs. Alt. ☽'s L.L.	Height of the Eye 8 Feet.					Height of Eye 12 Ft.					Height of Eye 16 Ft.					Height of Eye 20 Feet.					Obs. Alt. ☽'s L.L.
	The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					
	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	
°	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	°
5	57	59	61	63	65	56	58	60	62	64	56	58	60	62	64	55	57	59	61	63	5
10	61	63	65	67	69	61	63	64	66	68	60	62	64	66	68	60	62	64	65	67	10
15	62	64	66	68	70	61	63	65	67	69	61	63	65	67	68	60	62	64	66	68	15
18	62	64	66	67	69	61	63	65	67	69	61	63	64	66	68	60	62	64	66	68	18
20	61	63	65	67	69	61	63	65	67	68	60	62	64	66	68	60	62	64	65	67	20
22	61	63	65	67	68	60	62	64	66	68	60	62	64	65	67	59	61	63	65	67	22
24	60	62	64	66	68	60	62	64	65	67	59	61	63	65	67	59	61	63	64	66	24
26	60	62	63	65	67	59	61	63	65	66	59	61	62	64	66	58	60	62	64	66	26
28	59	61	63	64	66	59	60	62	64	66	58	60	62	63	65	58	59	61	63	65	28
30	58	60	62	64	65	58	60	61	63	65	57	59	61	63	64	57	59	60	62	64	30
32	58	59	61	63	64	57	59	60	62	64	56	58	60	62	63	56	58	59	61	63	32
34	57	58	60	62	63	56	58	59	61	63	56	57	59	61	62	55	57	58	60	62	34
36	56	57	59	61	62	55	57	58	60	62	55	56	58	59	61	54	56	57	59	61	36
38	55	56	58	59	61	54	56	57	59	60	54	55	57	58	60	53	55	56	58	59	38
39	54	56	57	59	60	54	55	57	58	60	53	55	56	58	59	52	54	56	57	59	39
40	54	55	57	58	60	53	54	56	58	59	52	54	56	57	69	52	54	55	57	58	40
41	53	54	56	58	59	52	53	56	57	58	52	53	55	56	58	51	53	54	56	57	41
42	52	54	55	57	58	52	53	55	56	58	51	53	54	56	57	51	52	54	55	57	42
43	52	53	55	56	58	51	52	54	55	57	51	52	54	55	57	50	52	53	55	56	43
44	51	53	54	56	57	51	52	53	55	56	50	52	53	54	56	50	51	53	54	55	44
45	51	52	54	55	56	50	51	53	54	56	49	51	52	54	55	49	50	52	53	55	45
46	50	51	53	54	55	49	50	52	53	55	49	50	52	53	54	48	50	51	53	54	46
47	49	51	52	53	55	49	49	51	53	54	48	50	51	52	54	48	49	50	52	53	47
48	49	50	51	53	54	48	49	51	52	53	48	49	50	52	53	47	48	50	51	52	48
49	48	49	51	52	53	47	48	50	51	53	47	48	49	51	52	46	48	49	50	52	49
50	47	49	50	51	52	47	47	49	51	52	46	47	49	50	51	46	47	48	50	51	50
51	47	48	49	50	52	46	47	48	50	51	45	47	48	49	50	45	46	48	49	50	51
52	46	47	48	50	51	45	46	48	49	50	45	46	47	48	50	44	46	47	48	49	52
53	45	46	48	49	50	45	46	47	48	49	44	45	46	48	49	44	45	46	47	48	53
54	44	46	47	48	49	44	45	46	47	48	43	44	46	47	48	43	44	45	46	48	54
55	44	45	46	47	48	43	44	45	46	48	43	44	45	46	47	42	43	44	46	47	55
56	43	44	45	46	47	42	43	45	46	47	42	43	44	45	46	41	42	44	45	46	56
57	42	43	44	45	46	42	43	44	45	46	41	42	43	44	45	41	42	43	44	45	57
58	41	42	43	45	46	41	42	43	44	45	40	41	42	43	44	40	41	42	43	44	58
59	41	42	43	44	45	40	41	42	43	44	39	40	42	43	44	39	40	41	42	43	59
60	40	41	42	43	44	39	40	41	42	43	39	40	41	42	43	38	39	40	41	42	60
61	39	40	41	42	43	38	39	40	41	42	38	39	40	41	42	37	38	39	40	41	61
62	38	39	40	41	42	38	39	39	40	41	37	38	39	40	41	37	38	38	39	40	62
63	37	38	39	40	41	37	38	39	39	40	36	37	38	39	40	36	37	38	39	39	63
64	37	37	38	39	40	36	37	38	39	39	35	36	37	38	39	35	36	37	38	39	64
65	36	37	37	38	39	35	36	37	38	39	35	35	36	37	38	34	35	36	37	38	65
66	35	36	37	37	38	34	35	36	37	38	34	35	35	36	37	33	34	35	36	37	66
67	34	35	36	36	37	33	34	35	36	37	33	34	35	35	36	32	33	34	35	36	67
68	33	34	35	35	36	33	33	34	35	36	32	33	34	34	35	32	32	33	34	35	68
69	32	33	34	34	35	32	32	33	34	35	31	32	33	33	34	31	31	32	33	34	69
70	31	32	33	34	34	31	32	32	33	34	30	31	32	32	33	30	31	31	32	33	70
71	31	31	32	33	33	30	31	31	32	33	29	30	31	31	32	29	30	30	31	32	71
72	30	30	31	32	32	29	30	30	31	32	29	29	30	30	31	28	29	29	30	31	72
73	29	29	30	31	31	28	29	29	30	31	28	28	29	29	30	27	28	28	29	30	73
74	28	29	29	30	30	27	28	28	29	30	27	27	28	29	29	26	27	28	28	29	74
75	27	28	28	29	29	26	27	28	28	29	26	26	27	28	28	26	26	27	27	28	75
76	26	27	27	28	28	26	26	27	27	28	25	26	26	27	27	25	25	26	26	27	76
77	25	26	26	27	27	25	25	26	26	26	24	25	25	26	26	24	24	25	25	26	77
78	24	25	25	26	26	24	24	25	25	25	23	24	24	25	25	23	23	24	24	24	78
79	23	24	24	25	25	23	23	24	24	24	22	23	23	24	24	22	22	23	23	23	79
80	23	23	23	24	24	22	22	23	23	23	21	22	22	23	23	21	21	22	22	22	80
81	22	22	22	23	23	21	21	22	22	22	21	21	21	21	22	20	20	21	21	21	81
82	21	21	21	22	22	20	20	21	21	21	20	20	20	20	21	19	19	20	20	20	82
83	20	20	20	21	21	19	19	20	20	20	19	19	19	19	20	18	18	19	19	19	83
84	19	19	19	20	20	18	19	19	19	19	18	18	18	18	19	17	18	18	18	18	84
85	18	18	18	19	19	17	18	18	18	18	17	17	17	17	18	16	17	17	17	17	85
86	17	17	17	17	18	16	17	17	17	17	16	16	16	16	17	15	16	16	16	16	86
87	16	16	16	16	17	16	16	16	16	16	15	15	15	15	15	15	15	15	15	15	87
88	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	14	88
89	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	13	89

TABLE VIII.—For Finding the Latitude by the Meridian Altitude of the Moon.

Obs. Alt. ☾'s L.L.	Height of the Eye 24 Feet.					Height of Eye 28 Ft.					Height of Eye 32 Ft.					Height of Eye 36 Feet.					Obs. Alt. ☾'s L.L.
	The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					The Moon's Horizontal Parallax.					
	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	54′	56′	58′	60′	62′	
°	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	°
5	55	57	59	61	63	55	57	59	61	63	54	56	58	60	62	54	56	58	60	62	5
10	59	61	63	65	67	59	61	63	65	67	58	60	62	64	66	58	60	62	64	66	10
15	60	62	64	66	68	60	61	63	65	67	59	61	63	65	67	59	61	63	65	67	15
18	60	62	64	66	68	59	61	63	65	67	59	61	63	65	67	59	61	63	64	66	18
20	60	61	63	65	67	59	61	63	65	67	59	61	63	64	66	58	60	62	64	66	20
22	59	61	63	65	67	59	61	62	64	66	58	60	62	64	66	58	60	62	64	65	22
24	59	60	62	64	66	58	60	62	64	65	58	60	61	63	65	57	59	61	63	65	24
26	58	60	62	63	65	58	59	61	63	65	57	59	61	63	64	57	59	60	62	64	26
28	57	59	61	63	64	57	59	60	62	64	57	58	60	62	64	56	58	60	61	63	28
30	56	58	60	62	63	56	58	60	61	63	56	57	59	61	63	55	57	59	61	62	30
32	56	57	59	61	62	55	57	59	60	62	55	57	58	60	62	55	56	58	60	61	32
34	55	56	58	60	61	54	56	58	59	61	54	56	57	59	61	54	55	57	59	60	34
36	54	55	57	59	60	53	55	57	58	60	53	55	56	58	59	53	54	56	58	59	36
38	53	54	56	57	59	52	54	55	57	59	52	54	55	57	58	52	53	55	56	58	38
39	52	54	55	57	58	52	53	55	56	58	51	53	55	56	58	51	53	54	56	57	39
40	52	53	55	56	58	51	53	54	56	57	51	52	54	55	57	51	52	54	55	57	40
41	51	53	54	56	57	51	52	54	55	57	50	52	53	55	56	50	51	53	55	56	41
42	50	52	53	55	56	50	52	53	55	56	50	51	53	54	56	49	51	52	54	55	42
43	50	51	53	54	56	49	51	52	54	55	49	51	52	54	55	49	50	52	53	55	43
44	49	51	52	54	55	49	50	52	53	55	49	50	51	53	54	48	50	51	53	54	44
45	49	50	51	53	54	48	50	51	52	54	48	49	51	52	54	48	49	50	52	53	45
46	48	49	51	52	54	48	49	50	52	53	47	49	50	51	53	47	48	50	51	52	46
47	47	49	50	51	53	47	48	50	51	52	47	48	49	51	52	46	48	49	50	52	47
48	47	48	49	51	52	46	48	49	50	52	46	47	49	50	51	46	47	48	50	51	48
49	46	47	49	50	51	46	47	48	50	51	45	47	48	49	51	45	46	48	49	50	49
50	45	47	48	49	50	45	46	47	49	50	45	46	47	48	50	44	46	47	48	49	50
51	45	46	47	48	50	44	45	47	48	49	44	45	46	48	49	44	45	46	47	49	51
52	44	45	46	48	49	44	45	46	47	48	43	44	46	47	48	43	44	45	47	48	52
53	43	44	46	47	48	43	44	45	46	48	42	44	45	46	47	42	43	45	46	47	53
54	42	44	45	46	47	42	43	44	46	47	42	43	44	45	46	41	43	44	45	46	54
55	42	43	44	45	46	41	42	44	45	46	41	42	43	44	46	41	42	43	44	45	55
56	41	42	43	44	45	41	42	43	44	45	40	41	42	44	45	40	41	42	43	44	56
57	40	41	42	43	45	40	41	42	43	44	39	41	42	43	44	39	40	41	42	44	57
58	39	40	42	43	44	39	40	41	42	43	39	40	41	42	43	38	39	41	42	43	58
59	39	40	41	42	43	38	39	40	41	42	38	39	40	41	42	38	39	40	41	42	59
60	38	39	40	41	42	37	38	39	40	41	37	38	39	40	41	37	38	39	40	41	60
61	37	38	39	40	41	37	38	39	40	41	36	37	38	39	40	36	37	38	39	40	61
62	36	37	38	39	40	36	37	38	39	40	36	36	37	38	39	35	36	37	38	39	62
63	35	36	37	38	39	35	36	37	38	39	35	36	36	37	38	34	35	36	37	38	63
64	35	35	36	37	38	34	35	36	37	38	34	35	36	36	37	34	34	35	36	37	64
65	34	35	35	36	37	33	34	35	36	37	33	34	35	36	36	33	34	34	35	36	65
66	33	34	35	35	36	33	33	34	35	36	32	33	34	35	35	32	33	34	34	35	66
67	32	33	34	34	35	32	33	33	34	35	31	32	33	34	34	31	32	33	33	34	67
68	31	32	33	34	34	31	32	32	33	34	31	31	32	33	34	30	31	32	32	33	68
69	30	31	32	33	33	30	31	31	32	33	30	30	31	32	33	29	30	31	31	32	69
70	30	30	31	32	32	29	30	31	31	32	29	29	30	31	32	28	29	30	31	31	70
71	29	29	30	31	31	28	29	30	30	31	28	29	29	30	31	28	28	29	30	30	71
72	28	28	29	30	30	27	28	29	29	30	27	28	28	29	30	27	27	28	29	29	72
73	27	27	28	29	29	27	27	28	28	29	26	27	27	28	29	26	26	27	28	28	73
74	26	27	27	28	28	26	26	27	27	28	25	26	26	27	27	25	26	26	27	27	74
75	25	26	26	27	27	25	25	26	26	27	24	25	25	26	26	24	25	25	26	26	75
76	24	25	25	26	26	24	24	25	25	26	24	24	24	25	25	23	24	24	25	25	76
77	23	24	24	25	25	23	23	24	24	25	23	23	24	24	24	22	23	23	24	24	77
78	22	23	23	24	24	22	22	23	23	24	22	22	23	23	23	21	22	22	23	23	78
79	22	22	22	23	23	21	22	22	22	23	21	21	22	22	22	21	21	21	22	22	79
80	21	21	21	22	22	20	21	21	21	22	20	20	21	21	21	20	20	20	21	21	80
81	20	20	20	21	21	19	20	20	20	21	19	19	20	20	20	19	19	19	20	20	81
82	19	19	19	20	20	18	19	19	19	20	18	18	19	19	19	18	18	18	19	19	82
83	18	18	18	19	19	18	18	18	18	18	17	17	18	18	18	17	17	17	18	18	83
84	17	17	17	18	18	17	17	17	17	17	16	16	17	17	17	16	16	16	17	17	84
85	16	16	16	17	17	16	16	16	16	16	15	15	16	16	16	15	15	15	16	16	85
86	15	15	15	16	16	15	15	15	15	15	14	15	15	15	15	14	14	14	15	15	86
87	14	14	14	15	15	14	14	14	14	14	13	14	14	14	14	13	13	13	13	14	87
88	13	13	13	13	14	13	13	13	13	13	13	13	13	13	13	12	12	12	12	13	88
89	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	89

TABLE IX.—For turning Degrees and Minutes into Time, and the contrary.

°	H. M.	°	H. M.	°	H. M.	°	H. M.	°	H. M.	°	H. M.
′	M. S.	′	M. S.	′	M. S.	′	M. S.	′	M. S.	′	M. S.
″	S. T.	″	S. T.	″	S. T.	″	S. T.	″	S. T.	″	S. T.
1	0. 4	61	4. 4	121	8. 4	181	12. 4	241	16. 4	301	20. 4
2	0. 8	62	4. 8	122	8. 8	182	12. 8	242	16. 8	302	20. 8
3	0. 12	63	4. 12	123	8. 12	183	12. 12	243	16. 12	303	20. 12
4	0. 16	64	4. 16	124	8. 16	184	12. 16	244	16. 16	304	20. 16
5	0. 20	65	4. 20	125	8. 20	185	12. 20	245	16. 20	305	20. 20
6	0. 24	66	4. 24	126	8. 24	186	12. 24	246	16. 24	306	20. 24
7	0. 28	67	4. 28	127	8. 28	187	12. 28	247	16. 28	307	20. 28
8	0. 32	68	4. 32	128	8. 32	188	12. 32	248	16. 32	308	20. 32
9	0. 36	69	4. 36	129	8. 36	189	12. 36	249	16. 36	309	20. 36
10	0. 40	70	4. 40	130	8. 40	190	12. 40	250	16. 40	310	20. 40
11	0. 44	71	4. 44	131	8. 44	191	12 44	251	16. 44	311	20. 44
12	0. 48	72	4. 48	132	8. 48	192	12. 48	252	16. 48	312	20. 48
13	0. 52	73	4. 52	133	8. 52	193	12. 52	253	16. 52	313	20. 52
14	0. 56	74	4. 56	134	8. 56	194	12. 56	254	16. 56	314	20. 56
15	1. 0	75	5. 0	135	9. 0	195	13. 0	255	17. 0	315	21. 0
16	1. 4	76	5. 4	136	9. 4	196	13. 4	256	17. 4	316	21. 4
17	1. 8	77	5. 8	137	9. 8	197	13. 8	257	17. 8	317	21. 8
18	1. 12	78	5. 12	138	9. 12	198	13. 12	258	17. 12	318	21. 12
19	1. 16	79	5. 16	139	9. 16	199	13. 16	259	17. 16	319	21. 16
20	1. 20	80	5. 20	140	9. 20	200	13. 20	260	17. 20	320	21. 20
21	1. 24	81	5. 24	141	9. 24	201	13. 24	261	17. 24	321	21. 24
22	1. 28	82	5. 28	142	9. 28	202	13. 28	262	17. 28	322	21. 28
23	1. 32	83	5. 32	143	9. 32	203	13. 32	263	17. 32	323	21. 32
24	1. 36	84	5. 36	144	9. 36	204	13. 36	264	17. 36	324	21. 36
25	1. 40	85	5. 40	145	9. 40	205	13. 40	265	17. 40	325	21. 40
26	1. 44	86	5. 44	146	9. 44	206	13. 44	266	17. 44	326	21. 44
27	1. 48	87	5. 48	147	9. 48	207	13. 48	267	17. 48	327	21. 48
28	1. 52	88	5. 52	148	9. 52	208	13. 52	268	17. 52	328	21. 52
29	1. 56	89	5. 56	149	9. 56	209	13. 56	269	17. 56	329	21. 56
30	2. 0	90	6. 0	150	10. 0	210	14. 0	270	18. 0	330	22. 0
31	2. 4	91	6. 4	151	10. 4	211	14. 4	271	18. 4	331	22. 4
32	2. 8	92	6. 8	152	10. 8	212	14. 8	272	18. 8	332	22. 8
33	2. 12	93	6. 12	153	10. 12	213	14. 12	273	18. 12	333	22. 12
34	2. 16	94	6. 16	154	10. 16	214	14. 16	274	18. 16	334	22. 16
35	2. 20	95	6. 20	155	10. 20	215	14. 20	275	18. 20	335	22. 20
36	2. 24	96	6. 24	156	10. 24	216	14. 24	276	18. 24	336	22. 24
37	2. 28	97	6. 28	157	10. 28	217	14. 28	277	18. 28	337	22. 28
38	2. 32	98	6. 32	158	10. 32	218	14. 32	278	18. 32	338	22. 32
39	2. 36	99	6. 36	159	10. 36	219	14. 36	279	18. 36	339	22. 36
40	2. 40	100	6. 40	160	10. 40	220	14. 40	280	18. 40	340	22. 40
41	2. 44	101	6. 44	161	10. 44	221	14. 44	281	18. 44	341	22. 44
42	2. 48	102	6. 48	152	10. 48	222	14. 48	282	18. 48	342	22. 48
43	2. 52	103	6. 52	163	10. 52	223	14. 52	283	18. 52	343	22. 52
44	2. 56	104	6. 56	164	10. 56	224	14. 56	284	18. 56	344	22. 56
45	3. 0	105	7. 0	165	11. 0	225	15. 0	285	19. 0	345	23. 0
46	3. 4	106	7. 4	166	11. 4	226	15. 4	286	19. 4	346	23. 4
47	3. 8	107	7. 8	167	11. 8	227	15. 8	287	19. 8	347	23. 8
48	3. 12	108	7. 12	168	11. 12	228	15. 12	288	19. 12	348	23. 12
49	3. 16	109	7. 16	169	11. 16	229	15. 16	289	19. 16	349	23. 16
50	3. 20	110	7. 20	170	11. 20	230	15. 20	290	19. 20	350	23. 20
51	3. 24	111	7. 24	171	11. 24	231	15. 24	291	19. 24	351	23. 24
52	3. 28	112	7. 28	172	11. 28	232	15. 28	292	19. 28	352	23. 28
53	3. 32	113	7. 32	173	11. 32	233	15. 32	293	19. 32	353	23. 32
54	3. 36	114	7. 36	174	11. 36	234	15. 36	294	19. 36	354	23. 36
55	3. 40	115	7. 40	175	11. 40	235	15. 40	295	19. 40	355	23. 40
56	3. 44	116	7. 44	176	11. 44	236	15. 44	296	19. 44	356	23. 44
57	3. 48	117	7. 48	177	11. 48	237	15. 48	297	19. 48	357	23. 48
58	3. 52	118	7. 52	178	11. 52	238	15. 52	298	19. 52	358	23. 52
59	3. 56	119	7. 56	179	11. 56	239	15. 56	299	19. 56	359	23. 56
60	4. 0	120	8. 0	180	12. 0	240	16. 0	300	20. 0	360	24. 0

TABLE X.
Dip of Horizon.

Height of Eye.	Dip of Hor.
Feet.	′ ″
1	0. 57
2	1. 21
3	1. 39
4	1. 55
5	2. 8
6	2. 20
7	2. 31
8	2. 42
9	2. 52
10	3. 1
11	3. 10
12	3. 18
13	3. 26
14	3. 34
15	3. 42
16	3. 49
17	3. 56
18	4. 3
19	4. 10
20	4. 16
21	4. 22
22	4. 28
23	4. 34
24	4. 40
26	4. 52
28	5. 3
30	5. 14
35	5. 39
40	6. 2
45	6. 24
50	6. 44
60	7. 23
70	7. 59
80	8. 32
90	9. 3
100	9. 33

TABLE XI.
Augmentation of the Moon's Semidiameter.

Moon's Alt.	Aug.
°	″
0	0
5	1
10	3
15	4
20	6
25	7
30	8
35	9
40	10
45	11
50	12
55	13
60	14
70	15
80	16
&c.	

TABLE XII.—The Sun's Parallax in Altitude.

Altitude	0°	10°	20°	30°	40°	50°	55°	60°	65°	70°	75°	80°	85°	90°
☉'s Par.	9″	9″	8″	8″	7″	6″	5″	4″	4″	3″	2″	2″	1″	0″

TABLE XIII.
THE MOON'S PARALLAX IN ALTITUDE.

☽'s Altitude.	Moon's Horizontal Parallax.									
	53′	54′	55′	56′	57′	58′	59′	60′	61′	62′
3°	53′	54′	55′	56′	57′	58′	59′	60′	61′	62′
7	53	54	55	56	57	58	59	60	61	62
11	52	53	54	55	56	57	58	59	60	61
15	51	52	53	54	55	56	57	58	59	60
17	51	52	53	54	55	55	56	57	58	59
19	50	51	52	53	54	55	56	57	58	59
21	49	50	51	52	53	54	55	56	57	58
23	49	50	51	52	52	53	54	55	56	57
25	48	49	50	51	52	53	53	54	55	56
27	47	48	49	50	51	52	53	53	54	55
29	46	47	48	49	50	51	52	52	53	54
31	45	46	47	48	49	50	51	51	52	53
33	44	45	46	47	48	49	49	50	51	52
35	43	44	45	46	47	48	48	49	50	51
37	42	43	44	45	46	46	47	48	49	50
39	41	42	43	44	44	45	46	47	47	48
41	40	41	42	42	43	44	45	45	46	47
43	39	39	40	41	42	42	43	44	45	45
45	37	38	39	40	40	41	42	42	43	44
47	36	37	38	38	39	40	40	41	42	42
49	35	35	36	37	37	38	39	39	40	41
51	33	34	35	35	36	36	37	38	38	39
53	32	32	33	34	34	35	36	36	36	37
55	30	31	32	32	33	33	34	34	35	36
57	29	29	30	30	31	32	32	33	33	34
59	27	28	28	29	29	30	30	31	31	32
61	26	26	27	27	28	28	29	29	30	30
63	24	25	25	25	26	26	27	27	28	28
65	22	23	23	24	24	25	25	25	26	26
67	21	21	21	22	22	23	23	23	24	24
69	19	19	20	20	20	21	21	22	22	22
71	17	18	18	18	19	19	19	20	20	20
73	15	16	16	16	17	17	17	18	18	18
75	14	14	14	14	15	15	15	16	16	16
77	12	12	12	13	13	13	13	13	14	14
79	10	10	10	11	11	11	11	11	12	12
81	8	8	9	9	9	9	9	9	10	10
83	6	7	7	7	7	7	7	7	7	8
85	5	5	5	5	5	5	5	5	5	5
87	3	3	3	3	3	3	3	3	3	3
89	1	1	1	1	1	1	1	1	1	1

The quantities in this Table, and the Parallax in Distance, are the Arguments for the first column in Table IV.

TABLE XIV.—Table of Mean Refractions, adapted to the Barometer 30 inches, and the Thermometer 50° of Fahrenheit.

Alt.	Refrac.	Alt.	Refr.	Alt.	Refr.	Alt.	Refr.
° ′	′ ″	° ′	′ ″	° ′	′ ″	°	″
0. 0	33.51	7.10	7.17	14.20	3.44	51	47
0.10	31.58	7.20	7. 8	14.30	3.42	52	45
0.20	30.13	7.30	6.59	14.40	3.38	53	44
0.30	28.37	7.40	6.51	14.50	3.37	54	42
0.40	27. 6	7.50	6.43	15. 0	3.34	55	41
0.50	25.43	8. 0	6.35	15.30	3.27	56	39
1. 0	24.25	8.10	6.28	16. 0	3.21	57	38
1.10	23.13	8.20	6.21	16.30	3.14	58	36
1.20	22. 8	8.30	6.14	17. 0	3. 9	59	35
1.30	21. 7	8.40	6. 7	17.30	3. 3	60	34
1.40	20.10	8.50	6. 0	18. 0	2.58	61	32
1.50	19.17	9. 0	5.54	19. 0	2.48	62	31
2. 0	18.29	9.10	5.47	20. 0	2.39	63	30
2.10	17.43	9.20	5.41	21. 0	2.31	64	28
2.20	17. 0	9.30	5.36	22. 0	2.23	65	27
2.30	16.21	9.40	5.30	23. 0	2.17	66	26
2.40	15.43	9.50	5.25	24. 0	2.10	67	25
2.50	15. 8	10. 0	5.20	25. 0	2. 4	68	24
3. 0	14.35	10.10	5.15	26. 0	1.59	69	22
3.10	14. 4	10.20	5.10	27. 0	1.54	70	21
3.20	13.35	10.30	5. 5	28. 0	1.49	71	20
3.30	13. 7	10.40	5. 0	29. 0	1.45	72	19
3.40	12.41	10.50	4.56	30. 0	1.41	73	18
3.50	12.16	11. 0	4.51	31. 0	1.37	74	17
4. 0	11.52	11.10	4.47	32. 0	1.33	75	16
4.10	11.30	11.20	4.43	33. 0	1.30	76	14
4.20	11.10	11.30	4.39	34. 0	1.26	77	13
4.30	10.50	11.40	4.35	35. 0	1.23	78	12
4.40	10.32	11.50	4.31	36. 0	1.20	79	11
4.50	10.15	12. 0	4.28	37. 0	1.17	80	10
5. 0	9.58	12.10	4.24	38. 0	1.14	81	9
5.10	9.42	12.20	4.21	39. 0	1.12	82	8
5.20	9.27	12.30	4.17	40. 0	1. 9	83	7
5.30	9.11	12.40	4.14	41. 0	1. 7	84	6
5.40	8.58	12.50	4.11	42. 0	1. 5	85	5
5.50	8.45	13. 0	4. 8	43. 0	1. 2	86	4
6. 0	8.32	13.10	4. 4	44. 0	1. 0	87	3
6.10	8.20	13.20	4. 1	45. 0	0.58	88	2
6.20	8. 9	13.30	3.58	46. 0	0.56	89	1
6.30	7.58	13.40	3.56	47. 0	0.54	90	0
6.40	7.47	13.50	3.53	48. 0	0.52		
6.50	7.37	14. 0	3.50	49. 0	0.51		
7. 0	7.27	14.10	3.47	50. 0	0.49		

TABLE XV.—A General Traverse Table.—Differences of Latitude and Departures.

Course.		Dist. 1.		Dist. 2.		Dist. 3.		Dist. 4.		Dist. 5.		Course.	
Pts.	Deg.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Deg.	Pts.
	1	0.9998	0.0175	1.9997	0.0349	2.9995	0.0524	3.9994	0.0698	4.9992	0.0873	89	
	2	0.9994	0.0349	1.9988	0.0698	2.9982	0.1047	3.9976	0.1396	4.9970	0.1745	88	
0¼		0.9988	0.0491	1.9976	0.0981	2.9964	0.1472	3.9952	0.1963	4.9940	0.2453		7¾
	3	0.9986	0.0523	1.9973	0.1047	2.9959	0.1570	3.9945	0.2093	4.9931	0.2617	87	
	4	0.9976	0.0698	1.9951	0.1395	2.9927	0.2093	3.9903	0.2790	4.9878	0.3488	86	
	5	0.9962	0.0872	1.9924	0.1743	2.9886	0.2615	3.9848	0.3486	4.9810	0.4358	85	
0½		0.9952	0.0980	1.9904	0.1960	2.9856	0.2941	3.9807	0.3921	4.9759	0.4901		7½
	6	0.9945	0.1045	1.9890	0.2091	2.9836	0.3136	3.9781	0.4181	4.9726	0.5226	84	
	7	0.9925	0.1219	1.9851	0.2437	2.9776	0.3656	3.9702	0.4875	4.9627	0.6093	83	
	8	0.9903	0.1392	1.9805	0.2783	2.9708	0.4175	3.9611	0.5567	4.9513	0.6959	82	
0¾		0.9892	0.1467	1.9784	0.2935	2.9675	0.4402	3.9567	0.5869	4.9459	0.7337		7¼
	9	0.9877	0.1564	1.9754	0.3129	2.9631	0.4693	3.9508	0.6257	4.9384	0.7822	81	
	10	0.9848	0.1736	1.9696	0.3473	2.9544	0.5209	3.9392	0.6946	4.9240	0.8682	80	
	11	0.9816	0.1908	1.9633	0.3816	2.9449	0.5724	3.9265	0.7632	4.9081	0.9540	79	
1		0.9808	0.1951	1.9616	0.3902	2.9424	0.5853	3.9231	0.7804	4.9039	0.9755		7
	12	0.9781	0.2079	1.9563	0.4158	2.9344	0.6237	3.9126	0.8316	4.8907	1.0396	78	
	13	0.9744	0.2250	1.9487	0.4499	2.9231	0.6749	3.8975	0.8998	4.8719	1.1248	77	
	14	0.9703	0.2419	1.9406	0.4838	2.9109	0.7258	3.8812	0.9677	4.8515	1.2096	76	
1¼		0.9700	0.2430	1.9401	0.4860	2.9101	0.7289	3.8801	0.9719	4.8502	1.2149		6¾
	15	0.9659	0.2588	1.9319	0.5176	2.8978	0.7765	3.8637	1.0353	4.8296	1.2941	75	
	16	0.9613	0.2756	1.9225	0.5513	2.8838	0.8269	3.8450	1.1025	4.8063	1.3782	74	
1½		0.9569	0.2903	1.9139	0.5806	2.8708	0.8709	3.8278	1.1611	4.7847	1.4514		6½
	17	0.9563	0.2924	1.9126	0.5847	2.8689	0.8771	3.8252	1.1695	4.7815	1.4619	73	
	18	0.9511	0.3090	1.9021	0.6180	2.8532	0.9271	3.8042	1.2361	4.7553	1.5451	72	
	19	0.9455	0.3256	1.8910	0.6511	2.8366	0.9767	3.7821	1.3023	4.7276	1.6278	71	
1¾		0.9415	0.3369	1.8831	0.6738	2.8246	1.0107	3.7662	1.3476	4.7077	1.6844		6¼
	20	0.9397	0.3420	1.8794	0.6840	2.8191	1.0261	3.7588	1.3681	4.6985	1.7101	70	
	21	0.9336	0.3584	1.8672	0.7167	2.8007	1.0751	3.7343	1.4335	4.6679	1.7918	69	
	22	0.9272	0.3746	1.8544	0.7492	2.7816	1.1238	3.7087	1.4984	4.6359	1.8730	68	
2		0.9239	0.3827	1.8478	0.7654	2.7716	1.1481	3.6955	1.5307	4.6194	1.9134		6
	23	0.9205	0.3907	1.8410	0.7815	2.7615	1.1722	3.6820	1.5629	4.6025	1.9537	67	
	24	0.9135	0.4067	1.8271	0.8135	2.7406	1.2202	3.6542	1.6269	4.5677	2.0337	66	
	25	0.9063	0.4226	1.8126	0.8452	2.7189	1.2679	3.6252	1.6905	4.5315	2.1131	65	
2¼		0.9040	0.4276	1.8080	0.8551	2.7120	1.2827	3.6160	1.7102	4.5199	2.1378		5¾
	26	0.8988	0.4384	1.7976	0.8767	2.6964	1.3151	3.5952	1.7535	4.4940	2.1919	64	
	27	0.8910	0.4540	1.7820	0.9080	2.6730	1.3620	3.5640	1.8160	4.4550	2.2700	63	
	28	0.8829	0.4695	1.7659	0.9389	2.6488	1.4084	3.5318	1.8779	4.4147	2.3474	62	
2½		0.8819	0.4714	1.7638	0.9428	2.6458	1.4142	3.5277	1.8856	4.4096	2.3570		5½
	29	0.8746	0.4848	1.7492	0.9696	2.6239	1.4544	3.4985	1.9392	4.3731	2.4240	61	
	30	0.8660	0.5000	1.7321	1.0000	2.5981	1.5000	3.4641	2.0000	4.3301	2.5000	60	
2¾		0.8577	0.5141	1.7155	1.0282	2.5732	1.5423	3.4309	2.0564	4.2886	2.5705		5¼
	31	0.8572	0.5150	1.7143	1.0301	2.5715	1.5451	3.4287	2.0602	4.2858	2.5752	59	
	32	0.8480	0.5299	1.6961	1.0598	2.5441	1.5898	3.3922	2.1197	4.2402	2.6496	58	
	33	0.8387	0.5446	1.6773	1.0893	2.5160	1.6339	3.3547	2.1786	4.1934	2.7232	57	
3		0.8315	0.5556	1.6629	1.1111	2.4944	1.6667	3.3259	2.2223	4.1573	2.7779		5
	34	0.8290	0.5592	1.6581	1.1184	2.4871	1.6776	3.3162	2.2368	4.1452	2.7960	56	
	35	0.8192	0.5736	1.6383	1.1472	2.4575	1.7207	3.2766	2.2943	4.0958	2.8679	55	
	36	0.8090	0.5878	1.6180	1.1756	2.4271	1.7634	3.2361	2.3511	4.0451	2.9389	54	
3¼		0.8032	0.5957	1.6064	1.1914	2.4096	1.7871	3.2128	2.3828	4.0160	2.9785		4¾
	37	0.7986	0.6018	1.5973	1.2036	2.3959	1.8054	3.1945	2.4073	3.9932	3.0091	53	
	38	0.7880	0.6157	1.5760	1.2313	2.3640	1.8470	3.1520	2.4626	3.9401	3.0783	52	
	39	0.7771	0.6293	1.5543	1.2586	2.3314	1.8880	3.1086	2.5173	3.8857	3.1466	51	
3½		0.7730	0.6344	1.5460	1.2688	2.3190	1.9032	3.0920	2.5376	3.8650	3.1720		4½
	40	0.7660	0.6428	1.5321	1.2856	2.2981	1.9284	3.0642	2.5712	3.8302	3.2139	50	
	41	0.7547	0.6561	1.5094	1.3121	2.2641	1.9682	3.0188	2.6242	3.7735	3.2803	49	
	42	0.7431	0.6691	1.4803	1.3383	2.2294	2.0074	2.9726	2.6765	3.7157	3.3457	48	
3¾		0.7410	0.6716	1.4819	1.3431	2.2229	2.0147	2.9638	2.6862	3.7048	3.3578		4¼
	43	0.7314	0.6820	1.4627	1.3640	2.1941	2.0460	2.9254	2.7280	3.6568	3.4100	47	
	44	0.7193	0.6947	1.4387	1.3893	2.1580	2.0840	2.8774	2.7786	3.5967	3.4733	46	
4	45	0.7071	0.7071	1.4142	1.4142	2.1213	2.1213	2.8284	2.8284	3.5355	3.5355	45	4
Pts.	Deg.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Deg.	Pts.
Course.		Dist. 1.		Dist. 2.		Dist. 3.		Dist. 4.		Dist. 5.		Course.	

TABLE XV.—A General Traverse Table.
For Degrees and Quarter-Points.

Course.		Dist. 6.		Dist. 7.		Dist. 8.		Dist. 9.		Dist. 10.		Course.	
Pts.	Deg.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Deg.	Pts.
	1	5.9991	0.1047	6.9989	0.1222	7.9988	0.1396	8.9986	0.1571	9.9985	0.1745	89	
	2	5.9963	0.2094	6.9957	0.2443	7.9951	0.2792	8.9945	0.3141	9.9939	0.3490	88	
0¼		5.9928	0.2944	6.9916	0.3435	7.9904	0.3925	8.9892	0.4416	9.9880	0.4907		7¾
	3	5.9918	0.3140	6.9904	0.3664	7.9890	0.4187	8.9877	0.4710	9.9863	0.5234	87	
	4	5.9854	0.4185	6.9829	0.4883	7.9805	0.5581	8.9781	0.6278	9.9756	0.6976	86	
	5	5.9772	0.5229	6.9734	0.6101	7.9696	0.6972	8.9658	0.7844	9.9619	0.8716	85	
0½		5.9711	0.5881	6.9663	0.6861	7.9615	0.7841	8.9567	0.8822	9.9518	0.9802		7½
	6	5.9671	0.6272	6.9617	0.7317	7.9562	0.8362	8.9507	0.9408	9.9452	1.0453	84	
	7	5.9553	0.7312	6.9478	0.8531	7.9404	0.9750	8.9329	1.0968	9.9255	1.2187	83	
	8	5.9416	0.8350	6.9319	0.9742	7.9221	1.1134	8.9124	1.2526	9.9027	1.3917	82	
0¾		5.9351	0.8804	6.9242	1.0271	7.9134	1.1738	8.9026	1.3206	9.8918	1.4673		7¼
	9	5.9261	0.9386	6.9138	1.0950	7.9015	1.2515	8.8892	1.4079	9.8769	1.5643	81	
	10	5.9088	1.0419	6.8937	1.2155	7.8785	1.3892	8.8633	1.5628	9.8481	1.7365	80	
	11	5.8898	1.1449	6.8714	1.3357	7.8530	1.5265	8.8346	1.7173	9.8163	1.9081	79	
1		5.8847	1.1705	6.8655	1.3656	7.8463	1.5607	8.8271	1.7558	9.8079	1.9509		7
	12	5.8689	1.2475	6.8470	1.4554	7.8252	1.6633	8.8033	1.8712	9.7815	2.0791	78	
	13	5.8462	1.3497	6.8206	1.5747	7.7950	1.7996	8.7693	2.0246	9.7437	2.2495	77	
	14	5.8218	1.4515	6.7921	1.6935	7.7624	1.9354	8.7327	2.1773	9.7030	2.4192	76	
1¼		5.8202	1.4579	6.7902	1.7009	7.7602	1.9438	8.7303	2.1868	9.7003	2.4298		6¾
	15	5.7956	1.5529	6.7615	1.8117	7.7274	2.0706	8.6933	2.3294	9.6593	2.5882	75	
	16	5.7676	1.6538	6.7288	1.9295	7.6901	2.2051	8.6513	2.4807	9.6120	2.7562	74	
1½		5.7416	1.7417	6.6986	2.0320	7.6555	2.3223	8.6125	2.6126	9.5694	2.9028		6½
	17	5.7378	1.7542	6.6941	2.0466	7.6504	2.3390	8.6067	2.6313	9.5630	2.9237	73	
	18	5.7063	1.8541	6.6574	2.1631	7.6085	2.4721	8.5595	2.7812	9.5106	3.0902	72	
	19	5.6731	1.9534	6.6186	2.2790	7.5642	2.6045	8.5097	2.9301	9.4552	3.2557	71	
1¾		5.6493	2.0213	6.5908	2.3582	7.5324	2.6951	8.4739	3.0320	9.4154	3.3689		6¼
	20	5.6382	2.0521	6.5778	2.3941	7.5175	2.7362	8.4572	3.0782	9.3969	3.4202	70	
	21	5.6015	2.1502	6.5351	2.5086	7.4686	2.8669	8.4022	3.2253	9.3358	3.5837	69	
	22	5.5631	2.2476	6.4903	2.6222	7.4175	2.9969	8.3447	3.3715	9.2718	3.7461	68	
2		5.5433	2.2961	6.4672	2.6788	7.3910	3.0615	8.3149	3.4442	9.2388	3.8268		6
	23	5.5230	2.3444	6.4435	2.7351	7.3640	3.1258	8.2845	3.5166	9.2050	3.9073	67	
	24	5.4813	2.4404	6.3948	2.8472	7.3084	3.2539	8.2219	3.6606	9.1355	4.0674	66	
	25	5.4378	2.5357	6.3442	2.9583	7.2505	3.3809	8.1568	3.8036	9.0631	4.2262	65	
2¼		5.4239	2.5653	6.3279	2.9929	7.2319	3.4204	8.1359	3.8480	9.0399	4.2756		5¾
	26	5.3928	2.6302	6.2916	3.0686	7.1904	3.5070	8.0891	3.9453	8.9879	4.3837	64	
	27	5.3460	2.7239	6.2370	3.1779	7.1280	3.6319	8.0191	4.0859	8.9101	4.5399	63	
	28	5.2977	2.8168	6.1806	3.2863	7.0636	3.7558	7.9465	4.2252	8.8295	4.6947	62	
2½		5.2915	2,8284	6.1734	3.2998	7.0554	3.7712	7.9373	4.2426	8.8192	4.7140		5½
	29	5.2477	2.9089	6.1223	3.3937	6.9970	3.8785	7.8716	4.3633	8.7462	4.8481	61	
	30	5.1962	3.0000	6.0622	3.5000	6.9282	4.0000	7.7942	4.5000	8.6603	5.0000	60	
2¾		5.1464	3.0846	6.0041	3.5987	6.8618	4.1128	7.7196	4.6269	8.5773	5.1410		5¼
	31	5.1430	3.0902	6.0002	3.6053	6.8573	4.1203	7.7145	4.6353	8.5717	5.1504	59	
	32	5.0883	3.1795	5.9363	3.7094	6.7844	4.2394	7.6324	4.7093	8.4805	5.2992	58	
	33	5.0320	3.2678	5.8707	3.8125	6.7094	4.3571	7.5480	4.9018	8.3867	5.4464	57	
3		4.9888	3.3334	5.8203	3.8890	6.6518	4.4446	7.4832	5.0001	8.3147	5.5557		5
	34	4.9742	3.3552	5.8033	3.9144	6.6323	4.4735	7.4613	5.0327	8.2904	5.5919	56	
	35	4.9149	3.4415	5.7341	4.0150	6.5532	4.5886	7.3724	5.1622	8.1915	5.7358	55	
	36	4.8541	3.5267	5.6631	4.1145	6.4721	4.7023	7.2812	5.2901	8.0902	5.8779	54	
3¼		4.8192	3.5742	5.6225	4.1699	6.4257	4.7656	7.2289	5.3613	8.0321	5.9570		4¾
	37	4.7918	3.6109	5.5904	4.2127	6.3891	4.8145	7.1877	5.4163	7.9864	6.0182	53	
	38	4.7281	3.6940	5.5161	4.3096	6.3041	4.9253	7.0921	5.5409	7.8801	6.1566	52	
	39	4.6629	3.7759	5.4400	4.4052	6.2172	5.0346	6.9943	5.6639	7.7715	6.2932	51	
3½		4.6381	3.8064	5.4111	4.4408	6.1841	5.0751	6.9571	5.7095	7.7301	6.3439		4½
	40	4.5963	3.8567	5.3623	4.4995	6.1284	5.1423	6.8944	5.7851	7.6604	6.4279	50	
	41	4.5283	3.9363	5.2830	4.5924	6.0377	5.2485	6.7924	5.9045	7.5471	6.5606	49	
	42	4.4589	4.0148	5.2020	4.6839	5.9452	5.3530	6.6883	6.0222	7.4314	6.6913	48	
3¾		4.4457	4.0294	5.1867	4.7009	5.9276	5.3725	6.6686	6.0440	7.4095	6.7156		4¼
	43	4.3881	4.0920	5.1195	4.7740	5.8508	5.4560	6.5822	6.1380	7.3135	6.8200	47	
	44	4.3160	4.1680	5.0354	4.8626	5.7547	5.5573	6.4741	6.2519	7.1934	6.9466	46	
4	45	4.2426	4.2426	4.9497	4.9497	5.6569	5.6569	6.3640	6.3640	7.0711	7.0711	45	4
Pts.	Deg.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Dep.	Lat.	Deg.	Pts.
Course.		Dist. 6.		Dist. 7.		Dist. 8.		Dist. 9.		Dist. 10.		Course.	

TABLE XVI. Showing the correction to be applied to the first of two altitudes (on account of the change of station) to reduce it to what it would have been if observed at the same place where the second altitude was observed.

N. B. The correction is additive to the first altitude if the angle be less than 8 Points, but subtractive if more.

ARGUMENT. The Angle between the Sun's bearing at the instant of the first observation, and the Ship's course in the interval between the observations, corrected for leeway.

Dist. run between the observations	¼ Point	½ Point	¾ Point	1 Point	1¼ Points	1½ Points	1¾ Points	2 Points	2¼ Points	2½ Points	2¾ Points	3 Points	3¼ Points	3½ Points	3¾ Points	4 Points
m	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
1	1. 0	1. 0	0.59	0.59	0.59	0.58	0.56	0.55	0.54	0.53	0.52	0.50	0.48	0.46	0.44	0.43
2	2. 0	1.59	1.59	1.58	1.56	1.55	1.53	1.51	1.49	1.46	1.43	1.40	1.37	1.33	1.29	1.25
3	3. 0	2.59	2.58	2.56	2.55	2.52	2.49	2.46	2.43	2.39	2.34	2.29	2.25	2.19	2.13	2. 7
4	4. 0	3.59	3.58	3.55	3.53	3.50	3.46	3.42	3.37	3.32	3.26	3.20	3.13	3. 5	2.58	2.50
5	4.59	4.59	4.57	4.54	4.51	4.47	4.43	4.37	4.31	4.25	4.17	4.10	4. 1	3.52	3.42	3.32
6	5.59	5.58	5.56	5.53	5.49	5 44	5.39	5.32	5.25	5.17	5. 9	4.59	4.49	4.38	4.27	4.14
7	6.59	6.58	6.55	6.52	6.47	6.42	6.35	6.28	6.20	6.10	6. 0	5.49	5 37	5.25	5.11	4.57
8	7.59	7.58	7.55	7.51	7.46	7.40	7.32	7.23	7.14	7. 4	6.52	6.39	6.26	6.11	5.56	5.40
9	8.59	8.58	8.54	8.50	8.44	8.37	8.28	8.19	8. 8	7.56	7.43	7.29	7.14	6.58	6.40	6.22
10	9.59	9.57	9.53	9.49	9.42	9.34	9.25	9.14	9. 2	8.49	8.35	8.19	8. 2	7.44	7.25	7. 4
11	10.59	10.57	10.53	10.47	10.40	10.32	10.22	10.10	9.56	9.42	9.26	9. 9	8.50	8.30	8. 9	7.47
12	11.59	11.56	11.52	11.46	11.38	11.29	11.18	11. 5	10.51	10.35	10.17	9.59	9.38	9.17	8.53	8.29
13	12.59	12.56	12.52	12.45	12.37	12.26	12.14	12. 1	11.45	11.28	11. 9	10.49	10.26	10. 3	9.38	9.11
14	13.59	13.56	13.51	13.44	13.35	13.24	13.11	12.56	12.40	12.21	12. 1	11.38	11.14	10.49	10.22	9.54
15	14.59	14.56	14.50	14.43	14.33	14.21	14. 7	13.52	13.33	13.14	12.52	12.28	12. 3	11.36	11. 7	10.37
16	15.59	15.55	15.50	15.41	15.31	15.19	15. 4	14.47	14.28	14. 7	13.43	13.18	12.51	12.22	11.52	11.19
17	16.59	16.55	16.49	16.40	16.29	16.16	16. 1	15.43	15.22	14.59	14.35	14. 8	13.39	13. 8	12.36	12. 1
18	17.59	17.55	17.49	17.39	17.28	17.13	16.57	16.38	16.16	15.52	15.26	14.58	14.28	13.55	13.20	12.44
19	18.59	18.55	18.47	18.38	18.26	18.11	17.53	17.33	17.11	16.46	16.18	15.48	15.16	14.41	14. 5	13.26
20	19.59	19.54	19.47	19.37	19.24	19. 8	18.50	18.29	18. 5	17.38	17. 9	16.38	16. 4	15.28	14.49	14. 8
21	20.59	20.54	20.46	20.36	20.22	20. 6	19.46	19.24	18.59	18.31	18. 1	17.28	16.52	16.14	15.33	14.51
22	21.58	21.53	21.46	21.35	21.20	21. 3	20.43	20.20	19.53	19.24	18.52	18 17	17.40	17. 1	16.18	15.33
23	22.58	22.53	22.45	22.34	22.19	22. 1	21.40	21.15	20.47	20.17	19.44	19. 7	18.28	17.47	17. 2	16.16
24	23.58	23.53	23.44	23.32	23.17	22.58	22.36	22.10	21.42	21.10	20.35	19.58	19.17	18.33	17.47	16.58
25	24.58	24.53	24.44	24.31	24.15	23.55	23.32	23. 6	22.36	22. 3	21.26	20.47	20. 5	19.20	18.31	17.41
26	25.58	25 52	25.43	25.30	25.13	24.53	24.29	24. 1	23.30	22 56	22.18	21.37	20.53	20. 6	19.16	18.23
27	26.58	26.52	26.43	26.29	26.11	25.50	25.25	24.56	24.25	23.49	23.10	22.27	21.41	20.52	20. 1	19. 5
28	27.58	27.52	27.42	27.28	27.10	26.47	26.22	25.52	25.19	24.41	24. 1	23.17	22.29	21.38	20.45	19.48
29	28.58	28.52	28.41	28.26	28. 8	27.45	27.18	26.47	26.13	25.35	24.52	24. 7	23.17	22.25	21.29	20.31
30	29.58	29.52	29.41	29.25	29. 6	28.43	28.15	27.43	27. 7	26.28	25.44	24.56	24. 6	23.11	22.14	21.13
31	30.58	30.51	30.40	30.24	30. 4	29.40	29.11	28.38	28. 1	27.20	26.35	25.47	24.54	23.58	22.58	21.55
32	31.58	31.51	31.39	31.23	31. 2	30.37	30. 8	29.33	28.56	28.13	27.27	26.37	25.42	24.44	23.43	22.38
33	32.58	32.50	32·38	32.27	32. 1	31.35	31. 4	30.29	29.50	29. 6	28.19	27.26	26.31	25.31	24.27	23.20
34	33.58	33.50	33.38	33.21	32.59	32.32	32. 1	31.25	30.44	29.59	29.10	28.16	27.19	26.17	25.11	24. 2
35	34.58	34.50	34.37	34.20	33.57	33.29	32.57	32.30	31.38	30.52	30. 1	29. 6	28. 7	27. 4	25.56	24.45
36	35.58	35.50	35.37	35.19	34.54	34.27	33.54	33.16	32.32	31.45	30.53	29.56	28.55	27.50	26.40	25.28
37	36.58	36.49	36.36	36.17	35.53	35.25	34.50	34.11	33.27	32.38	31.44	30.46	29.43	28.36	27.25	26.10
38	37.57	37.49	37.35	37.16	36.52	36.22	35.47	35. 7	34.21	33.31	32.35	31.36	30.31	29.23	28.10	26.52
39	38.57	38.49	38.35	38.15	37.50	37.19	36.43	36. 2	35.16	34.23	33.27	32.26	31.19	30. 9	28.54	27.35
40	39.57	39.49	39.34	39.14	38.48	38.17	37.40	36.58	36.10	35.17	34.19	33.16	32. 8	30.55	29.38	28.17
Dist. run, &c.	15¾ Points	15½ Points	15¼ Points	15 Points	14¾ Points	14½ Points	14¼ Points	14 Points	13¾ Points	13½ Points	13¼ Points	13 Points	12¾ Points	12½ Points	12¼ Points	12 Points

N. B. If the object's bearing at the first observation and the Ship's course in the interval are the same, the whole distance must be added to the first altitude, but when opposite, *i. e.* 16 Points, the correction is subtractive from the first altitude.

TABLE XVI. Showing the correction to be applied to the first of two altitudes (on account of the change of station) to reduce it to what it would have been if observed at the same place where the second altitude was observed.

N. B. The correction is additive to the first altitude if the angle be less than 8 Points, but subtractive if more.

ARGUMENT. The Angle between the Sun's bearing at the instant of the first observation, and the Ship's course in the interval between the observations, corrected for leeway.

Dist. run between the observations.	4¼ Points	4½ Points	4¾ Points	5 Points	5¼ Points	5½ Points	5¾ Points	6 Points	6¼ Points	6½ Points	6¾ Points	7 Points	7¼ Points	7½ Points	7¾ Points	8 Points
m	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
1	0.40	0.38	0.36	0.33	0.30	0.28	0.26	0.23	0.20	0.17	0.14	0.12	0. 9	0. 6	0. 3	0. 0
2	1.20	1.16	1.11	1. 7	1. 2	0.56	0.52	0.46	0.40	0.35	0.29	0.23	0.17	0.12	0. 6	0. 0
3	2. 1	1.54	1.47	1.40	1.32	1.25	1.17	1. 9	1. 1	0.52	0.44	0.35	0.26	0.17	0. 9	0. 0
4	2.41	2.32	2.23	2.13	2. 4	1.53	1.43	1.32	1.21	1.10	0.58	0.47	0.35	0.23	0.12	0. 0
5	3.22	3.10	2.59	2.47	2.34	2.22	2. 8	1.55	1.41	1.27	1.13	0.59	0.44	0.29	0.15	0. 0
6	4. 2	3.49	3.34	3.20	3. 5	2.50	2.34	2.18	2. 1	1.44	1.28	1.10	0.53	0.35	0.17	0. 0
7	4.42	4.26	4.10	3.53	3.36	3.18	2.59	2.41	2.22	2. 2	1.42	1.22	1. 2	0.41	0.20	0. 0
8	5.22	5. 5	4.46	4.26	4. 7	3.46	3.25	3. 4	2.42	2.19	1.56	1.33	1.10	0.47	0.23	0. 0
9	6. 2	5.43	5.22	5. 0	4.38	4.14	3.51	3.26	3. 2	2.37	2.11	1.45	1.19	0.53	0.26	0. 0
10	6.43	6.20	5.58	5.33	5. 8	4.43	4.17	3.50	3.22	2.54	2.26	1.57	1.28	0.59	0.29	0. 0
11	7.23	6.59	6.33	6. 7	5.40	5.11	4.42	4.13	3.43	3.11	2.40	2. 9	1.37	1. 5	0.32	0. 0
12	8. 4	7.37	7. 9	6.40	6.10	5.40	5. 9	4.35	4. 2	3.29	2.55	2.20	1.46	1.11	0.35	0. 0
13	8.44	8.15	7.44	7.13	6.41	6. 8	5.33	4.59	4.23	3.46	3.10	2.32	1.55	1.16	0.38	0. 0
14	9.24	8.53	8.20	7.47	7.12	6.36	5.59	5.22	4.43	4. 4	3.24	2.44	2. 3	1.22	0.41	0 0
15	10. 4	9.31	8.56	8.20	7.43	7. 4	6.25	5.44	5. 3	4.21	3.38	2.56	2.12	1.28	0.44	0. 0
16	10.44	10. 9	9.32	8.53	8.14	7.32	6.50	6. 7	5.23	4.38	3.53	3. 7	2.21	1 34	0.47	0. 0
17	11.25	10.47	10. 8	9.26	8.44	8. 1	7.16	6.31	5.44	4.56	4. 8	3.19	2.29	1.40	0.50	0. 0
18	12. 5	11.25	10.43	10. 0	9.15	8.29	7.42	6.53	6. 4	5.14	4.22	3.31	2.38	1.46	0.53	0. 0
19	12.46	12. 3	11.19	10.33	9.46	8.58	8. 8	7.16	6.24	5.31	4.37	3.43	2.47	1.52	0.56	0. 0
20	13.26	12.41	11.55	11. 7	10.17	9.26	8.33	7.39	6.44	5.49	4.52	3.54	2.56	1.58	0.59	0. 0
21	14. 6	13.19	12.31	11.40	10.48	9.54	8.59	8. 2	7. 4	6. 6	5. 6	4. 6	3. 5	2. 4	1. 2	0. 0
22	14.46	13.58	13. 7	12.13	11.19	10.22	9 25	8.25	7.25	6.23	5.21	4.17	3.14	2.10	1 5	0. 0
23	15.27	14.35	13.42	12.47	11.49	10.50	9.50	8.48	7.45	6.41	5.35	4.29	3.22	2.15	1. 8	0. 0
24	16. 7	15.14	14.18	13.20	12.20	11.19	10.16	9.11	8. 5	6.58	5.50	4.41	3 31	2.21	1.11	0. 0
25	16.47	15.52	14.53	13.53	12.51	11.47	10.41	9.34	8.25	7.16	6. 4	4.53	3.40	2.27	1.14	0. 0
26	17.28	16.30	15.29	14.26	13.22	12.16	11. 7	9.57	8.46	7.33	6.19	5. 4	3.49	2.33	1.17	0. 0
27	18. 8	17. 8	16. 5	15. 0	13.53	12.44	11.33	10.20	9. 6	7.50	6.33	5.16	3.58	2.39	1.19	0. 0
28	18.48	17.46	16.41	15.33	14.23	13.12	11.58	10.43	9.26	8. 9	6.48	5.28	4. 7	2.44	1.22	0. 0
29	19.28	18.24	17.17	16. 7	14.55	13.40	12.24	11. 6	9.46	8.25	7. 3	5.40	4.16	2.50	1.25	0. 0
30	20. 9	19. 2	17.52	16.40	15.25	14. 8	12.50	11.29	10. 7	8.43	7.17	5.51	4.24	2.56	1.28	0. 0
31	20.49	19.41	18.28	17.13	15.56	14.37	13.16	11 52	10.26	9.00	7.32	6. 3	4.33	3. 2	1.31	0. 0
32	21.29	20.18	19. 4	17.47	16.27	15. 5	13.41	12.15	10.47	9.17	7.47	6.14	4.42	3. 8	1.34	0. 0
33	22.10	20.56	19.40	18.20	16.58	15.33	14. 7	12.38	11. 7	9.35	8. 1	6.26	4.50	3.14	1.37	0. 0
34	22.50	21.34	20.15	18.53	17.29	16. 2	14.32	13. 1	11.27	9.52	8.16	6.38	4.59	3.20	1.40	0. 0
35	23.30	22.12	20.51	19.26	18.00	16.30	14.58	13.23	11.47	10.10	8.30	6.50	5. 8	3.26	1.43	0. 0
36	24.11	22.50	21.27	20.00	18.31	16.58	15.24	13.47	12. 8	10.27	8.45	7. 1	5.17	3.32	1.46	0 0
37	24.51	23.28	22. 2	20.33	19. 1	17.26	15.49	14.10	12.28	10.44	8.59	7.13	5.26	3.38	1.49	0. 0
38	25.31	24. 7	22.38	21. 7	19.32	17.55	16.15	14.32	12.48	11. 2	9.14	7.25	5.35	3.43	1.52	0. 0
39	26.11	24.44	23.14	21.40	20. 3	18.23	16.41	14.55	13. 8	11.19	9.29	7.37	5.43	3.49	1.55	0. 0
40	26.52	25.23	23.50	22.13	20.33	18.52	17. 7	15.19	13.29	11.37	9.43	7.48	5.52	3.55	1.58	0. 0
Dist. run, &c.	11¾ Points	11½ Points	11¼ Points	11 Points	10¾ Points	10½ Points	10¼ Points	10 Points	9¾ Points	9½ Points	9¼ Points	9 Points	8¾ Points	8½ Points	8¼ Points	8 Points

N. B. If the object's bearing at the first observation and the Ship's course in the interval are the same, the whole distance must be added to the first altitude, but when opposite, *i. e.* 16 Points, the correction is subtractive from the first altitude.

TABLE XVII.—Equation of Time for 1842, &c., for Mean Noon.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Sub.	Sub.	Sub.	Sub.	Add.	Add.	Sub.	Sub.	Add.	Add.	Add.	Add.
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	3.51	13.55	12.39	4. 1	3. 2	2.35	3.22	6. 0	0. 6	10.17	16.17	10.48
2	4.19	14. 3	12.27	3.43	3.10	2.26	3.34	5.57	0.24	10.36	16.18	10.25
3	4.47	14.10	12.14	3.25	3.17	2.17	3.45	5.53	0.43	10.54	16.18	10. 2
4	5.15	14.16	12. 1	3. 7	3.23	2. 7	3.56	5.48	1. 3	11.12	16.17	9.37
5	5.42	14.21	11.48	2.49	3.29	1.57	4. 7	5.42	1.22	11.30	16.16	9.13
6	6. 8	14.25	11.34	2.32	3.34	1.46	4.17	5.37	1.42	11.48	16.13	8.47
7	6.35	14.28	11.19	2.14	3.39	1.35	4.27	5.30	2. 2	12. 5	16.10	8.22
8	7. 0	14.31	11. 4	1.57	3.43	1.24	4.37	5.23	2.22	12.22	16. 6	7.55
9	7.26	14.33	10.49	1.40	3.46	1.13	4.46	5.15	2.42	12.38	16. 1	7.28
10	7.50	14.34	10.34	1.24	3.49	1. 1	4.55	5. 7	3. 3	12.54	15.56	7. 1
11	8.14	14.35	10.18	1. 7	3.51	0.49	5. 4	4.58	3.24	13. 9	15.49	6.34
12	8.38	14.34	10. 2	0.51	3.53	0.37	5.12	4.48	3.44	13.24	15.42	6. 6
13	9. 1	14.33	9.45	0.35	3.54	0.25	5.19	4.38	4. 5	13.39	15.34	5.37
14	9.23	14.31	9.29	0.20	3.55	0.12	5.26	4.28	4.26	13.53	15.25	5. 9
15	9.45	14.28	9.12	0. 5	3.55	0. 0	5.33	4.17	4.48	14. 6	15.15	4.40
				Add		Sub.						
16	10. 6	14.25	8.54	0.10	3.54	0.13	5.39	4. 5	5. 9	14.19	15. 4	4.11
17	10.26	14.21	8.37	0.25	3.53	0.26	5.45	3.53	5.30	14.32	14.53	3.42
18	10.45	14.16	8.19	0.39	3.52	0.39	5.50	3.40	5.51	14.44	14.41	3.12
19	11. 4	14.10	8. 1	0.52	3.50	0.52	5.54	3.26	6.12	14.55	14.28	2.43
20	11.22	14. 4	7.43	1. 6	3.47	1. 5	5.58	3.13	6.33	15. 5	14.14	2.13
21	11.39	13.57	7.25	1.19	3.44	1.17	6. 1	2.58	6.54	15.15	13.59	1.43
22	11.56	13.49	7. 7	1.31	3.40	1.30	6. 4	2.44	7.15	15.24	13.43	1.13
23	12.11	13.41	6.48	1.43	3.36	1.43	6. 6	2.28	7.36	15.33	13.27	0.43
24	12.26	13.32	6.30	1.55	3.31	1.56	6. 8	2.13	7.57	15.41	13.10	0.13
												Sub.
25	12.40	13.23	6.11	2. 6	3.26	2. 9	6. 9	1.57	8.18	15.48	12.52	0.17
26	12.53	13.13	5.52	2.17	3.20	2.21	6.10	1.40	8.38	15.54	12.33	0.47
27	13. 6	13. 2	5.34	2.27	3.14	2.34	6. 9	1.24	8.58	16. 0	12.14	1.17
28	13.17	12.51	5.15	2.36	3. 7	2.46	6. 9	1. 6	9.18	16. 5	11.53	1.46
29	13.28		4.57	2.46	3. 0	2.58	6. 8	0.49	9.38	16. 9	11.32	2.16
30	13.38		4.38	2.54	2.52	3.10	6. 6	0.31	9.57	16.12	11.11	2.45
31	13.47		4.20		2.44		6. 3	0.13		16.15		3.14

TABLE XVIII.—Equation of Time for 1843, &c., for Mean Noon.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Sub.	Sub.	Sub.	Sub.	Add.	Add.	Sub.	Sub.	Add.	Add.	Add.	Add.
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	3.43	13.53	12.42	4. 7	2.58	2.35	3.22	6. 3	0. 0	10.11	16.16	10.54
2	4.11	14. 1	12.30	3.49	3. 6	2.26	3.33	6. 0	0.18	10.30	16.17	10.31
3	4.40	14. 8	12.18	3.31	3.13	2.16	3.45	5.56	0.37	10.49	16.18	10. 8
4	5. 7	14.14	12. 5	3.13	3.19	2. 7	3.56	5.51	0.57	11. 7	16.17	9.44
5	5.35	14.19	11.51	2.55	3.25	1.57	4. 7	5.46	1.16	11.25	16.16	9.20
6	6. 1	14.24	11.37	2.37	3.31	1.46	4.17	5.40	1.36	11.43	16.14	8.55
7	6.28	14.27	11.23	2.20	3.35	1.36	4.27	5.33	1.56	12. 1	16.12	8.29
8	6.54	14.30	11. 8	2. 3	3.40	1.25	4.37	5.26	2.17	12.18	16. 8	8. 3
9	7.19	14.32	10.53	1.46	3.43	1.13	4.46	5.18	2.37	12.34	16. 4	7.37
10	7.44	14.33	10.38	1.29	3.47	1. 2	4.55	5.10	2.58	12.50	15.58	7.10
11	8. 8	14.34	10.22	1.12	3.49	0.50	5. 3	5. 1	3.19	13. 6	15.52	6.42
12	8.31	14.34	10. 6	0.56	3.51	0.38	5.11	4.51	3.39	13.21	15.45	6.14
13	8.54	14.32	9.49	0.40	3.53	0.26	5.19	4.41	4. 0	13.36	15.37	5.46
14	9.16	14.31	9.33	0.24	3.54	0.14	5.26	4.31	4.21	13.50	15.28	5.18
15	9.38	14.28	9.16	0. 9	3.54	0. 1	5.32	4.20	4.43	14. 4	15.19	4.49
				Add		Sub.						
16	9.59	14.25	8.58	0. 6	3.54	0.11	5.38	4. 8	5. 4	14.17	15. 8	4.20
17	10.19	14.21	8.41	0.21	3.53	0.24	5.44	3.56	5.25	14.29	14.57	3.50
18	10.39	14.16	8.23	0.35	3.51	0.37	5.49	3.43	5.46	14.41	14.45	3.21
19	10.58	14.10	8. 5	0.49	3.49	0.50	5.54	3.30	6. 7	14.52	14.32	2.51
20	11.16	14. 4	7.47	1. 2	3.47	1. 3	5.58	3.17	6.28	15. 3	14.18	2.21
21	11.33	13.57	7.29	1.15	3.44	1.16	6. 1	3. 2	6.49	15.13	14. 3	1.51
22	11.50	13.50	7.11	1.28	3.40	1.29	6. 5	2.48	7.10	15.22	13.47	1.21
23	12. 5	13.42	6.52	1.40	3.36	1.42	6. 7	2.33	7.31	15.31	13.31	0.51
24	12.21	13.33	6.34	1.51	3.31	1.55	6. 9	2.18	7.51	15.39	13.14	0.21
												Sub.
25	12.35	13.24	6.15	2. 2	3.26	2. 8	6.10	2. 2	8.12	15.46	12.56	0. 9
26	12.48	13.15	5.57	2.13	3.20	2.20	6.11	1.46	8.32	15.52	12.38	0.39
27	13. 1	13. 4	5.39	2.23	3.13	2.33	6.11	1.29	8.52	15.58	12.18	1. 9
28	13.13	12.53	5.20	2.33	3. 7	2.45	6.11	1.12	9.12	16. 3	11.58	1.39
29	13.24		5. 2	2.42	2.59	2.58	6.10	0.55	9.32	16. 8	11.37	2. 8
30	13.35		4.43	2.50	2.52	3.10	6. 8	0.37	9.52	16.11	11.16	2.38
31	13.44		4.25		2.43		6. 6	0.19		16.14		3. 6

TABLE XIX.—Equation of Time for 1844, &c., for Mean Noon.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Sub.	Sub.	Sub.	Sub.	Add.	Add.	Sub.	Sub.	Add.	Add.	Add.	Add.
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	3.35	13.50	12.32	3.53	3. 4	2.28	3.30	6. 0	0.15	10.26	16.17	10.37
2	4. 3	13.58	12.20	3.34	3.11	2.19	3.41	5.56	0.34	10.45	16.18	10.14
3	4.31	14. 5	12. 7	3.16	3.18	2.10	3.52	5.51	0.53	11. 3	16.18	9.50
4	4.59	14.11	11.54	2.58	3.24	2. 0	4. 3	5.46	1.13	11.22	16.17	9.25
5	5.26	14.16	11.40	2.41	3.30	1.50	4.14	5.40	1.32	11.39	16.15	9. 0
6	5.53	14.21	11.25	2.23	3.35	1.39	4.24	5.34	1.52	11.57	16.12	8.35
7	6.19	14.25	11.11	2. 6	3.39	1.28	4.33	5.27	2.12	12.14	16. 8	8. 9
8	6.45	14.28	10.56	1.49	3.43	1.17	4.43	5.19	2.33	12.30	16. 4	7.42
9	7.11	14.30	10.40	1.32	3.46	1. 5	4.52	5.11	2.53	12.46	15.59	7.15
10	7.35	14.31	10.25	1.15	3.49	0.53	5. 1	5. 3	3.14	13. 2	15.53	6.48
11	8. 0	14.32	10. 9	0.59	3.51	0.41	5. 9	4.53	3.34	13.17	15.46	6.20
12	8.24	14.32	9.52	0.43	3.53	0.29	5.17	4.44	3.55	13.32	15.38	5.51
13	8.47	14.31	9.36	0.28	3.54	0.17	5.24	4.33	4.16	13.46	15.29	5.23
14	9. 9	14.30	9.19	0.12	3.54	0. 4	5.31	4.22	4.37	14. 0	15.20	4.54
				Add		Sub.						
15	9.31	14.27	9. 2	0. 3	3.53	0. 9	5.37	4.11	4.58	14.13	15. 9	4.25
16	9.52	14.24	8.44	0.17	3.53	0.21	5.43	3.59	5.19	14.25	14.58	3.56
17	10.13	14.21	8.27	0.31	3.51	0.34	5.48	3.47	5.40	14.37	14.46	3.26
18	10.33	14.16	8. 9	0.45	3.49	0.47	5.53	3.34	6. 1	14.49	14.33	2.56
19	10.52	14.11	7.51	0.58	3.47	1. 0	5.58	3.20	6.22	14.59	14.20	2.27
20	11.10	14. 5	7.33	1.11	3.44	1.13	6. 1	3. 6	6.43	15.10	14. 5	1.57
21	11.28	13.59	7.15	1.24	3.40	1.26	6. 5	2.52	7. 4	15.19	13.50	1.27
22	11.45	13.52	6.57	1.36	3.36	1.39	6. 7	2.37	7.25	15.28	13.34	0.57
23	12. 1	13.44	6.39	1.48	3.31	1.52	6. 9	2.22	7.46	15.36	13.17	0.27
												Sub.
24	12.17	13.36	6.20	1.59	3.26	2. 5	6.10	2. 6	8. 7	15.44	13. 0	0. 3
25	12.31	13.26	6. 2	2.10	3.20	2.18	6.11	1.50	8.27	15.51	12,42	0.33
26	12.45	13.17	5.43	2.20	3.14	2.30	6.11	1.33	8.48	15.57	12.23	1. 2
27	12.58	13. 7	5.25	2.30	3. 8	2.43	6.11	1.16	9. 8	16. 2	12. 3	1.32
28	13.10	12.56	5. 6	2.39	3. 1	2.55	6.10	0.58	9.28	16. 7	11.42	2. 1
29	13.21	12.44	4.48	2.48	2.53	3. 7	6. 8	0.41	9.47	16.10	11.21	2.31
30	13.31		4.29	2.56	2.45	3.19	6. 6	0.22	10. 7	16.14	10.59	3. 0
31	13.41		4.11		2.37		6. 3	0. 4		16.16		3.28

TABLE XX.—Equation of Time for 1845, &c., for Mean Noon.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Sub.	Sub.	Sub.	Sub.	Add.	Add.	Sub.	Sub.	Add.	Add.	Add.	Add.
	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.	M. S.
1	3.57	13.56	12.35	3.56	3. 3	2.31	3.27	6. 0	0.10	10.21	16.17	10.42
2	4.25	14. 3	12.23	3.38	3.11	2.22	3.38	5.57	0.29	10.40	16.17	10.19
3	4.53	14.10	12.10	3.20	3.17	2.13	3.49	5.52	0.48	10.59	16.17	9.55
4	5.20	14.16	11.57	3. 2	3.23	2. 3	4. 0	5.47	1. 7	11.17	16.16	9.31
5	5.47	14.20	11.43	2.45	3.29	1.52	4.11	5.42	1.27	11.35	16.15	9. 6
6	6.14	14.25	11.29	2.27	3.34	1.42	4.21	5.36	1.47	11.52	16.12	8.41
7	6.40	14.28	11.15	2.10	3.38	1.31	4.31	5.29	2. 7	12. 9	16. 9	8.15
8	7. 6	14.31	11. 0	1.53	3.42	1.19	4.41	5.22	2.27	12.26	16. 5	7.48
9	7.31	14.32	10.45	1.36	3.46	1. 8	4.50	5.14	2.48	12.42	16. 0	7.21
10	7.55	14.33	10.29	1.20	3.48	0.56	4.59	5. 5	3. 8	12.58	15.54	6.54
11	8.19	14.33	10.13	1. 3	3.50	0.44	5. 7	4.56	3.29	13.14	15.47	6.27
12	8.43	14.33	9.57	0.47	3.52	0.32	5.15	4.46	3.50	13.28	15.40	5.59
13	9. 5	14.31	9.40	0.32	3.53	0.20	5.22	4.36	4.11	13.43	15.32	5.30
14	9.28	14.29	9.24	0.16	3.54	0. 7	5.29	4.25	4.32	13.57	15.23	5. 2
				Add		Sub.						
15	9.49	14.26	9. 7	− 1	3.54	0. 5	5.36	4.14	4.53	14.10	15.13	4.33
16	10.10	14.23	8.49	+14	3.53	0.18	5.41	4. 2	5.15	14.23	15. 2	4. 4
17	10.29	14.18	8.32	0.28	3.52	0.31	5.47	3.49	5.36	14.35	14.50	3.34
18	10.49	14.13	8.14	0.42	3.50	0.44	5.52	3.36	5.57	14.47	14.38	3. 5
19	11. 7	14. 7	7.56	0.56	3.48	0.56	5.56	3.23	6.18	14.58	14.24	2.35
20	11.25	14. 1	7.38	1. 9	3.45	1. 9	6. 0	3. 9	6.39	15. 8	14.10	2. 5
21	11.42	13.54	7.20	1.22	3.42	1.22	6. 3	2.55	7. 0	15.18	13.55	1.35
22	11.58	13.46	7. 1	1.34	3.38	1.35	6. 5	2.40	7.21	15.27	13.39	1. 5
23	12.13	13.37	6.43	1.46	3.34	1.48	6. 7	2.24	7.42	15.35	13.22	0.35
24	12.28	13.28	6.24	1.57	3.29	2. 1	6. 9	2. 9	8. 3	15.43	13. 5	0. 5
												Sub.
25	12.42	13.19	6. 6	2. 8	3.23	2.13	6.10	1.53	8.23	15.50	12.47	0.25
26	12.55	13. 9	5.47	2.19	3.17	2.26	6.10	1.36	8.43	15.56	12.28	0.55
27	13. 7	12.58	5.28	2.29	3.11	2.38	6.10	1.19	9. 4	16. 1	12. 8	1.25
28	13.18	12.47	5.10	2.38	3. 4	2.51	6. 9	1. 2	9.23	16. 6	11.48	1.54
29	13.29		4.51	2.47	2.56	3. 3	6. 8	0.44	9.43	16.10	11.26	2.24
30	13.39		4.33	2.56	2.48	3.15	6. 6	0.27	10. 2	16.13	11. 4	2.53
31	13.48		4.15		2.40		6. 3	0. 8		16.15		3.22

TABLE XXI.—The Sun's Declination for 1843, &c., for Apparent Noon.

Days.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
	South	South.	South.	North.	North.	North.	North.	North.	North.	South.	South	South.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	23. 3	17.12	7.43	4.24	14.58	22. 1	23. 9	18. 9	8.27	3. 2	14.20	21.46
2	22.58	16.54	7.20	4.47	15.16	22. 9	23. 5	17.54	8. 5	3.25	14.39	21.55
3	22.52	16.37	6.57	5.11	15.34	22.17	23. 1	17.38	7.43	3.49	14.58	22. 4
4	22.46	16.19	6.34	5.33	15.52	22.24	22.56	17.22	7.21	4.12	15.16	22.13
5	22.40	16. 1	6.11	5.56	16. 9	22.31	22.51	17. 6	6.59	4.35	15.35	22.21
6	22.33	15.43	5.48	6.19	16.26	22.37	22.45	16.50	6.36	4.58	15.53	22.28
7	22.26	15.24	5.24	6.42	16.43	22.44	22.39	16.34	6.14	5.21	16.11	22.35
8	22.18	15. 6	5. 1	7. 4	16.59	22.49	22.33	16.17	5.51	5.44	16.29	22.42
9	22.10	14.47	4.38	7.27	17.16	22.55	22.26	16. 0	5.29	6. 7	16.46	22.48
10	22. 1	14.27	4.14	7.49	17.32	23. 0	22.19	15.42	5. 6	6.30	17. 3	22.54
11	21.52	14. 8	3.51	8.11	17.47	23. 4	22.11	15.25	4.43	6.53	17.20	22.59
12	21.42	13.48	3.27	8.33	18. 3	23. 8	22. 3	15. 7	4.20	7.15	17.37	23. 4
13	21.33	13.28	3. 3	8.55	18.18	23.12	21 55	14.49	3.58	7.38	17.53	23. 9
14	21.22	13. 8	2.40	9.17	18.32	23.16	21.46	14.31	3.35	8. 0	18. 9	23.13
15	21.11	12.47	2.16	9.38	18.47	23.19	21.37	14.12	3.11	8.23	18.25	23.16
16	21. 0	12.27	1.53	10. 0	19. 1	23.21	21.27	13.53	2.48	8.45	18.40	23.19
17	20.49	12. 6	1.29	10.21	19.15	23.23	21.18	13.34	2.25	9. 7	18.55	23.22
18	20.37	11.45	1. 5	10.42	19.28	23.25	21. 7	13.15	2. 2	9.29	19.10	23.24
19	20.25	11.24	0.41	11. 3	19.41	23.26	20.57	12.56	1.39	9.51	19.24	23.26
20	20.12	11. 2	0.18 S	11.24	19.54	23.27	20.46	12.36	1.15	10.13	19.38	23.27
21	19.59	10.41	0. 6 N	11.44	20. 7	23.28	20.35	12.16	0.52	10.34	19.51	23.27
22	19.45	10.19	0.30	12. 4	20.19	23.28	20.23	11.56	0.29	10.56	20. 5	23.28
23	19.32	9.57	0.53	12.25	20.31	23.27	20.11	11.36	0. 5 N	11.17	20.17	23.27
24	19.17	9.35	1.17	12.44	20.42	23.26	19.59	11.16	0.18 S	11.38	20.30	23.27
25	19. 3	9.13	1.41	13. 4	20.53	23.25	19.46	10.55	0.42	11.59	20.42	23.25
26	18.48	8.50	2. 4	13.24	21. 4	23.24	19.33	10.34	1. 5	12.20	20.54	23.24
27	18.33	8.28	2.28	13.43	21.14	23.22	19.20	10.13	1.29	12.40	21. 5	23.22
28	18.17	8. 5	2.51	14. 2	21.24	23.19	19. 6	9.52	1.52	13. 0	21.16	23.19
29	18. 1		3.15	14.21	21.34	23.16	18.52	9.31	2.15	13.20	21.26	23.16
30	17.45		3.38	14.40	21.43	23.13	18.38	9.10	2.39	13.40	21.36	23.12
31	17.28		4. 1		21.52		18.24	8.48		14. 0		23. 8

TABLE XXII.—The Sun's Declination for 1844, &c., for Apparent Noon.

Days.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	South.	South.	South.	North.	North.	North.	North.	North.	North.	South.	South.	South.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	′	° ′
1	23. 4	17.16	7.25	4.42	15.12	22. 7	23. 6	17.57	8.10	3.20	14.34	21.53
2	22.59	16.59	7. 2	5. 5	15.30	22.15	23. 2	17.42	7.48	3.43	14.53	22. 2
3	22.53	16.41	6.39	5.28	15.47	22.22	22.57	17.26	7.26	4. 6	15.12	22.11
4	22.48	16.24	6.16	5.51	16. 5	22.29	22.52	17.10	7. 4	4.29	15.30	22.19
5	22.41	16. 6	5.53	6.13	16.22	22.36	22.47	16.54	6.42	4.53	15.49	22.26
6	22.35	15.48	5.30	6.36	16.39	22.42	22.41	16.38	6.19	5.16	16. 7	22.34
7	22.27	15.29	5. 7	6.59	16.55	22.48	22.34	16.21	5.57	5.39	16.25	22.40
8	22.20	15.10	4.43	7.21	17.12	22.53	22.28	16. 4	5.34	6. 2	16.42	22.47
9	22.12	14.51	4.20	7.43	17.28	22.59	22.20	15.47	5.12	6.24	16.59	22.53
10	22. 3	14.32	3.56	8. 6	17.43	23. 3	22.13	15.29	4.49	6.47	17.16	22.58
11	21.54	14.13	3.33	8.28	17.59	23. 7	22. 5	15.11	4.26	7.10	17.33	23. 3
12	21.45	13.53	3. 9	8.50	18.14	23.11	21.57	14.53	4. 3	7.33	17.49	23. 8
13	21.35	13.33	2.46	9.11	18.29	23.15	21.48	14.35	3.40	7.55	18. 5	23.12
14	21.25	13.13	2.22	9.33	18.43	23.18	21.39	14.17	3.17	8.17	18.21	23.15
15	21.14	12.52	1.58	9.54	18.58	23.20	21.30	13.58	2.54	8.40	18.36	23.18
16	21. 3	12.32	1.35	10.16	19.11	23.23	21.20	13.39	2.31	9. 2	18.51	23.21
17	20.52	12.11	1.11	10.37	19.25	23.24	21.10	13.20	2. 7	9.24	19. 6	23.23
18	20.40	12.50	0.47	10.58	19.38	23.26	20.59	13. 0	1.44	9.46	19.20	23.25
19	20.28	11.29	0.23 S	11.19	19.51	23.27	20.48	12.41	1.21	10. 7	19.34	23.26
20	20.15	11. 7	0. 0 N	11.39	20. 4	23.27	20.37	12.21	0.58	10.29	19.48	23.27
21	20. 2	10.46	0.24	11.59	20.16	23.28	20.26	12. 1	0.34	10.50	20. 1	23.27
22	19.49	10.24	0.48	12.20	20.28	23.27	20.14	11.41	0.11 N	11.12	20.14	23.27
23	19.35	10. 2	1.11	12.40	20.39	23.27	20. 2	11.21	0.13 S	11.33	20.27	23.27
24	19.21	9.40	1.35	12.59	20.51	23.25	19.49	11. 0	0.36	11.54	20.39	23.26
25	19. 6	9.18	1.58	13.19	21. 1	23.24	19.36	10.39	0.59	12.15	20.51	23.24
26	18.52	8.56	2.22	13.38	21.12	23.22	19.23	10.19	1.23	12.35	21. 2	23.22
27	18.36	8.33	2.45	13.57	21.22	23.20	19.10	9.57	1.46	12.55	21.13	23.20
28	18.21	8.11	3. 9	14.16	21.32	23.17	18.56	9.36	2.10	13.16	21.24	23.17
29	18. 5	7.48	3.32	14.35	21.41	23.14	18.42	9.15	2.33	13.36	21.34	23.13
30	17.49		3.55	14.53	21.50	23.10	18.27	8.53	2.56	13.55	21.44	23. 9
31	17.32		4.19		21.59		18.12	8.32		14.15		23. 5

TABLE XXIII.—The Sun's Declination for 1845, &c., for Apparent Noon.

Days.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	South.	South.	South.	North.	North.	North.	North.	North.	North.	South.	South.	South.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	23. 0	17. 3	7.31	4.36	15. 7	22. 5	23. 7	18. 1	8.15	3.14	14.29	21.51
2	22.55	16.45	7. 8	4.59	15.25	22.13	23. 3	17.46	7.53	3.37	14.48	22. 0
3	22.49	16.28	6.45	5.22	15.43	22.20	22.58	17.30	7.31	4. 1	15. 7	22. 9
4	22.43	16.10	6.22	5.45	16. 0	22.27	22.53	17.14	7. 9	4.24	15.26	22.17
5	22.36	15.52	5.59	6. 8	16.18	22.34	22.48	16.58	6.47	4.47	15.44	22.25
6	22.29	15.33	5.36	6.31	16.35	22.41	22.42	16.42	6.25	5.10	16. 2	22.32
7	22.22	15.15	5.12	6.53	16.51	22.47	22.36	16.25	6. 2	5.33	16.20	22.39
8	22.14	14.56	4.49	7.16	17. 8	22.52	22.29	16. 8	5.40	5.56	16.38	22.45
9	22. 5	14.37	4.26	7.38	17.24	22.57	22.22	15.51	5.17	6.19	16.55	22.51
10	21.56	14.17	4. 2	8. 0	17.39	23. 2	22.15	15.33	4.54	6.42	17.12	22.57
11	21.47	13.57	3.39	8.22	17.55	23. 6	22. 7	15.16	4.32	7. 4	17.29	23. 2
12	21.37	13.38	3.15	8.44	18.10	23.10	21.59	14.58	4. 9	7.27	17.45	23. 7
13	21.27	13.17	2.51	9. 6	18.25	23.14	21.50	14.39	3.46	7.50	18. 1	23.11
14	21.17	12.57	2.28	9.28	18.40	23.17	21.41	14.21	3.23	8.12	18.17	23.14
15	21. 6	12.37	2. 4	9.49	18.54	23.20	21.32	14. 2	3. 0	8.34	18.32	23.18
16	20.54	12.16	1.40	10.10	19. 8	23.22	21.22	13.44	2.36	8.56	18.48	23.20
17	20.43	11.55	1.17	10.32	19.22	23.24	21.12	13.24	2.13	9.18	19. 2	23.23
18	20.30	11.34	0.53	10.53	19.35	23.25	21. 2	13. 5	1.50	9.40	19.17	23.25
19	20.18	11.12	0.29	11.13	19.48	23.27	20.51	12.46	1.27	10. 2	19.31	23.26
20	20. 5	10.51	0. 6 S	11.34	20. 1	23.27	20.40	12 26	1. 3	10.24	19.45	23.27
21	19.52	10.29	0.18 N	11.54	20.13	23.27	20.29	12. 6	0.40	10.45	19.58	23.27
22	19.38	10. 8	0.42	12.15	20.25	23.27	20.17	11.46	0.17 N	11. 7	20.11	23.27
23	19.24	9.46	1. 5	12.35	20.37	23.27	20. 5	11.26	0. 7 S	11.28	20.24	23.27
24	19.10	9.23	1.29	12.55	20.48	23.26	19.52	11. 5	0.30	11.49	20.36	23.26
25	18.55	9. 1	1.53	13.14	20.59	23.24	19.39	10.44	0.54	12. 9	20.48	23.24
26	18.40	8.39	2.16	13.34	21. 9	23.23	19.26	10.24	1.17	12.30	20.59	23.23
27	18.25	8.16	2.40	13.53	21.19	23.20	19.13	10. 3	1.40	12.50	21.11	23.20
28	18. 9	7.54	3. 3	14.12	21.29	23.18	18.59	9.41	2. 4	13.11	21.21	23.17
29	17.53		3.26	14.30	21.39	23.15	18.45	9.20	2.27	13.31	21.32	23.14
30	17.36		3.50	14.49	21.48	23.11	18.31	8.59	2.51	13.50	21.41	23.10
31	17.20		4.13		21.56		18.16	8.37		14.10		23. 6

TABLE XXIV.—The Sun's Declination for 1846, &c., for Apparent Noon.

Days.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	South.	South.	South.	North.	North.	North.	North.	North.	North.	South.	South.	South.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	23. 1	17. 7	7.36	4.30	15. 3	22. 3	23. 8	18. 4	8.20	3. 8	14.25	21.49
2	22.56	16.50	7.14	4.54	15.21	22.11	23. 4	17.49	7.59	3.32	14.44	21.58
3	22.50	16.32	6.51	5.17	15.39	22.18	23. 0	17.34	7.37	3.55	15. 3	22. 7
4	22.44	16.14	6.28	5.39	15.56	22.26	22.55	17.18	7.15	4.18	15.21	22.15
5	22.38	15.56	6. 5	6. 2	16.13	22.33	22.49	17. 2	6.52	4.41	15.40	22.23
6	22.31	15.38	5.41	6.25	16.30	22.39	22.43	16.46	6.30	5. 5	15.58	22.30
7	22.23	15.19	5.18	6.48	16.47	22.45	22.37	16.29	6. 8	5.28	16.16	22.37
8	22.15	15. 0	4.55	7.10	17. 4	22.51	22.31	16.12	5.45	5.51	16.34	22.44
9	22. 7	14.41	4.31	7.32	17.20	22.56	22.24	15.55	5.23	6.13	16.51	22.50
10	21.58	14.22	4. 8	7.55	17.36	23. 1	22.16	15.38	5. 0	6.36	17. 8	22.55
11	21.49	14. 2	3.44	8.17	17.51	23. 5	22. 9	15.20	4.37	6.59	17.25	23. 1
12	21.40	13.43	3.21	8.39	18. 6	23. 9	22. 1	15. 2	4.14	7.22	17.41	23. 5
13	21.30	13.22	2.57	9. 1	18.21	23.13	21.52	14.44	3.51	7.44	17.57	23.10
14	21.19	13. 2	2.34	9.22	18.36	23.16	21.43	14.25	3.28	8. 7	18.13	23.14
15	21. 8	12.42	2.10	9.44	18.50	23.19	21.34	14. 7	3. 5	8.29	18.29	23.17
16	20.57	12.21	1.46	10. 5	19. 5	23.22	21.25	13.48	2.42	8.51	18.44	23.20
17	20.46	12. 0	1.23	10.26	19.18	23.24	21.15	13.29	2.19	9.13	18.59	23.22
18	20.34	11.39	0.59	10.47	19.32	23.25	21. 4	13.10	1.55	9.35	19.13	23.24
19	20.21	11.18	0.35	11. 8	19.45	23.26	20.54	12.50	1.32	9.57	19.28	23.26
20	20. 8	10.56	0.11 S	11.29	19.57	23.27	20.43	12.31	1. 9	10.19	19.41	23.27
21	19.55	10.35	0.12 N	11.49	20.10	23.27	20.31	12.11	0.45	10.40	19.55	23.27
22	19.42	10.13	0.36	12.10	20.22	23.27	20.20	11.51	0.22 N	11. 1	20. 8	23.27
23	19.28	9.51	1. 0	12.30	20.34	23.27	20. 8	11.30	0. 1 S	11.23	20.21	23.27
24	19.13	9.29	1.23	12.50	20.45	23.26	19.55	11.10	0.25	11.44	20.33	23.26
25	18.59	9. 7	1.47	13. 9	20.56	23.25	19.42	10.49	0.48	12. 4	20.45	23.25
26	18.44	8.44	2.10	13.29	21. 7	23.23	19.29	10.29	1.12	12.25	20.57	23.23
27	18.28	8.22	2.34	13.48	21.17	23.21	19.16	10. 8	1.35	12.46	21. 8	23.21
28	18.13	7.59	2.57	14. 7	21.27	23.18	19. 2	9.46	1.58	13. 6	21.19	23.18
29	17.57		3.21	14.26	21.36	23.15	18.48	9.25	2.22	13.26	21.29	23.15
30	17.40		3.44	14.44	21.46	23.12	18.34	9. 4	2.45	13.46	21.39	23.11
31	17.24		4. 7		21.54		18.19	8.42		14. 5		23. 7

TABLE XXV.—To reduce the Sun's Declination (nearly) to any given Meridian, and to any given Time under that Meridian.

Add in W. Sub. in E.	Sub. in W. Add in E.	LONGITUDE.																		Add in W. Sub. in E.	Sub. in W. Add in E.
		10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	170°	180°		
		′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′		
December. 20	December. 22	0·0	0·0	0·0	0·0	0·0	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	June. 20	June. 22
19	23	0·0	0·0	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·3	0·3	0·3	0·3	0·3	0·4	0·4	0·4	0·4	19	23
18	24	0·0	0·1	0·1	0·1	0·2	0·2	0·2	0·3	0·3	0·4	0·4	0·4	0·5	0·5	0·5	0·6	0·6	0·6	18	24
17	25	0·1	0·1	0·1	0·2	0·2	0·3	0·3	0·4	0·4	0·5	0·5	0·6	0·6	0·7	0·7	0·8	0·8	0·9	17	25
16	26	0·1	0·1	0·2	0·2	0·3	0·4	0·4	0·5	0·5	0·6	0·7	0·7	0·8	0·8	0·9	1·0	1·0	1·1	16	26
15	27	0·1	0·1	0·2	0·3	0·4	0·4	0·5	0·6	0·7	0·8	0·8	0·9	0·9	1·0	1·1	1·2	1·2	1·3	15	27
14	28	0·1	0·2	0·2	0·3	0·4	0·5	0·6	0·7	0·8	0·9	0·9	1·0	1·1	1·2	1·3	1·4	1·4	1·5	14	28
13	29	0·1	0·2	0·3	0·4	0·5	0·6	0·7	0·8	0·9	1·0	1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	13	29
11	31	0·1	0·2	0·4	0·5	0·6	0·7	0·8	1·0	1·1	1·2	1·3	1·5	1·6	1·7	1·8	1·9	2·1	2·2	11	July. 1
10	January. 1	0·1	0·3	0·4	0·5	0·7	0·8	0·9	1·1	1·2	1·3	1·5	1·6	1·7	1·9	2·0	2·1	2·3	2·4	10	2
9	2	0·1	0·3	0·4	0·6	0·7	0·9	1·0	1·2	1·3	1·5	1·6	1·8	1·9	2·0	2·2	2·3	2·5	2·6	9	3
8	3	0·1	0·3	0·5	0·6	0·8	0·9	1·1	1·3	1·4	1·6	1·7	1·9	2·1	2·2	2·4	2·5	2·7	2·8	8	4
7	4	0·2	0·3	0·5	0·7	0·8	1·0	1·2	1·4	1·5	1·7	1·9	2·0	2·2	2·4	2·6	2·7	2·9	3·1	7	5
6	5	0·2	0·4	0·5	0·7	0·9	1·1	1·3	1·4	1·6	1·8	2·0	2·2	2·4	2·5	2·7	2·9	3·1	3·3	6	6
5	6	0·2	0·4	0·6	0·8	1·0	1·2	1·4	1·5	1·7	1·9	2·1	2·3	2·5	2·7	2·9	3·1	3·3	3·5	5	7
4	7	0·2	0·4	0·6	0·8	1·0	1·2	1·4	1·6	1·8	2·0	2·3	2·5	2·7	2·9	3·1	3·3	3·5	3·7	4	8
3	8	0·2	0·4	0·6	0·9	1·1	1·3	1·5	1·7	1·9	2·2	2·4	2·6	2·8	3·0	3·2	3·5	3·7	3·9	3	9
1	10	0·2	0·5	0·7	0·9	1·2	1·4	1·7	1·9	2·1	2·4	2·6	2·9	3·1	3·3	3·6	3·8	4·1	4·3	1	11
November. 29	12	0·3	0·5	0·8	1·0	1·3	1·6	1·8	2·1	2·3	2·6	2·9	3·1	3·4	3·6	3·9	4·2	4·4	4·7	May. 30	13
27	14	0·3	0·6	0·8	1·1	1·4	1·7	2·0	2·3	2·5	2·8	3·1	3·4	3·7	4·0	4·2	4·5	4·8	5·1	28	15
25	16	0·3	0·6	0·9	1·2	1·5	1·8	2·1	2·4	2·7	3·0	3·3	3·6	3·9	4·3	4·6	4·9	5·2	5·5	26	17
23	18	0·3	0·6	1·0	1·3	1·6	1·9	2·3	2·6	2·9	3·2	3·6	3·9	4·2	4·5	4·9	5·2	5·5	5·8	24	19
21	20	0·3	0·7	1·0	1·4	1·7	2·1	2·4	2·8	3·1	3·4	3·8	4·1	4·5	4·8	5·2	5·5	5·9	6·2	22	21
19	22	0·4	0·7	1·1	1·5	1·8	2·2	2·5	2·9	3·3	3·6	4·0	4·4	4·7	5·1	5·5	5·8	6·2	6·6	20	23
17	24	0·4	0·8	1·1	1·5	1·9	2·3	2·7	3·1	3·4	3·8	4·2	4·6	5·0	5·4	5·7	6·1	6·5	6·9	18	25
15	26	0·4	0·8	1·2	1·6	2·0	2·4	2·8	3·2	3·6	4·0	4·4	4·8	5·2	5·6	6·0	6·4	6·8	7·2	16	27
13	28	0·4	0·8	1·3	1·7	2·1	2·5	2·9	3·4	3·8	4·2	4·6	5·0	5·5	5·9	6·3	6·7	7·1	7·6	14	29
11	30	0·4	0·9	1·3	1·7	2·2	2·6	3·1	3·5	3·9	4·4	4·8	5·2	5·7	6·1	6·6	7·0	7·4	7·9	12	31
9	February. 1	0·4	0·9	1·4	1·8	2·3	2·7	3·2	3·6	4·1	4·5	5·0	5·4	5·9	6·4	6·8	7·3	7·7	8·2	10	August. 2
7	3	0·5	0·9	1·4	1·9	2·3	2·8	3·3	3·8	4·3	4·7	5·2	5·6	6·1	6·6	7·0	7·5	8·0	8·5	8	4
5	5	0·5	1·0	1·4	1·9	2·4	2·9	3·4	3·9	4·4	4·8	5·3	5·8	6·3	6·8	7·3	7·7	8·2	8·7	6	6
3	7	0·5	1·0	1·5	2·0	2·5	3·0	3·5	4·0	4·5	5·0	5·5	6·0	6·5	7·0	7·5	8·0	8·5	9·0	4	8
1	9	0·5	1·0	1·5	2·0	2·5	3·1	3·6	4·1	4·6	5·1	5·6	6·1	6·7	7·2	7·7	8·2	8·7	9·2	2	10
October. 30	11	0·5	1·0	1·6	2·1	2·6	3·1	3·7	4·2	4·7	5·3	5·8	6·3	6·8	7·3	7·9	8·4	8·9	9·5	April. 30	12
28	13	0·5	1·1	1·6	2·1	2·7	3·2	3·8	4·3	4·8	5·4	5·9	6·5	7·0	7·5	8·1	8·6	9·1	9·7	28	14
26	15	0·5	1·1	1·6	2·2	2·7	3·3	3·8	4·4	4·9	5·5	6·0	6·6	7·2	7·7	8·2	8·8	9·3	9·9	26	16
24	17	0·6	1·1	1·7	2·2	2·8	3·4	3·9	4·5	5·0	5·6	6·2	6·7	7·3	7·9	8·4	9·0	9·6	10·1	24	18
21	20	0·6	1·1	1·7	2·3	2·9	3·5	4·0	4·6	5·2	5·8	6·3	6·9	7·5	8·1	8·7	9·2	9·8	10·4	21	21
18	23	0·6	1·2	1·8	2·4	3·0	3·5	4·1	4·7	5·3	5·9	6·5	7·1	7·7	8·3	8·9	9·5	10·0	10·6	18	24
15	26	0·6	1·2	1·8	2·4	3·0	3·6	4·2	4·8	5·4	6·0	6·6	7·2	7·9	8·5	9·1	9·7	10·3	10·9	15	27
12	March. 1	0·6	1·2	1·8	2·5	3·1	3·7	4·3	4·9	5·5	6·2	6·8	7·4	8·0	8·6	9·2	9·8	10·5	11·1	12	30
9	4	0·6	1·2	1·9	2·5	3·1	3·7	4·4	5·0	5·6	6·3	6·9	7·5	8·1	8·8	9·4	10·0	10·6	11·3	9	September. 2
6	7	0·6	1·3	1·9	2·5	3·2	3·8	4·4	5·1	5·7	6·3	7·0	7·6	8·2	8·9	9·5	10·1	10·8	11·4	6	5
3	10	0·6	1·3	1·9	2·6	3·2	3·8	4·5	5·1	5·8	6·4	7·0	7·7	8·3	9·0	9·6	10·3	10·9	11·5	3	8
Sept. 30	13	0·6	1·3	1·9	2·6	3·2	3·9	4·5	5·2	5·8	6·5	7·1	7·7	8·4	9·0	9·7	10·3	11·0	11·6	March. 31	11
27	16	0·7	1·3	1·9	2·6	3·2	3·9	4·5	5·2	5·8	6·5	7·1	7·8	8·4	9·1	9·7	10·4	11·0	11·7	28	14
24	19	0·7	1·3	2·0	2·6	3·2	3·9	4·5	5·2	5·9	6·5	7·2	7·8	8·5	9·1	9·8	10·4	11·1	11·7	23	17
Add after N. Sub. before N.	Sub. after N. Add before N.	h 0⅔	h 1⅓	h 2·0	h 2⅔	h 3⅓	h 4·0	h 4⅔	h 5⅓	h 6·0	h 6⅔	h 7⅓	h 8·0	h 8⅔	h 9⅓	h 10·0	h 10⅔	h 11⅓	h 12·0	Add after N. Sub. before N.	Sub. after N. Add before N.
		TIME FROM NOON.																			

Example.—Required the ⊙'s Declination at Noon, Aug. 2nd, 1844, in Long. 140° W.

⊙'s Declination at Noon at Greenwich, Table XXII. Aug. 2nd .... 17°. 42′. 0″ N.

Correction, Table XXV., 140° W. is 6′·4.............................. = — 6.24

Declination required .... 17.35.36 N.

TABLE XXVI.—Change of the Sun's Declination in periods of Four Years.

Periods of complete Years.	Months.															Periods of complete Years.
	January.					February.					March.					
	Days.					Days.					Days.					
	1	7	13	19	25	1	7	13	19	25	1	7	13	19	25	
	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Add	
	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	
4	0·1	0·2	0·3	0·4	0·4	0·5	0·5	0·6	0·6	0·7	0·7	0·7	0·7	0·7	0·7	4
8	0·3	0·4	0·6	0·7	0·8	1·0	1·1	1·2	1·2	1·3	1·3	1·4	1·4	1·4	1·4	8
12	0·4	0·7	0·9	1·1	1·3	1·5	1·6	1·7	1·9	2·0	2·0	2·1	2·1	2·1	2·1	12
16	0·6	0·9	1·2	1·4	1·7	2·0	2·2	2·3	2·5	2·6	2·7	2·7	2·8	2·8	2·8	16
20	0·7	1·1	1·5	1·8	2·1	2·5	2·7	2·9	3·1	3·3	3·4	3·5	3·5	3·6	3·6	20

Periods of complete Years.	April.					May.					June.					Periods of complete Years.
	Days.					Days.					Days.					
	1	7	13	19	25	1	7	13	19	25	1	7	13	19	25	
	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Sub.	
	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	
4	0·7	0·7	0·7	0·6	0·6	0·6	0·5	0·5	0·4	0·3	0·3	0·2	0·1	0·0	0·1	4
8	1·4	1·4	1·3	1·3	1·2	1·1	1·0	0·9	0·8	0·7	0·5	0·4	0·2	0·0	0·1	8
12	2·1	2·1	2·0	1·9	1·8	1·7	1·6	1·4	1·2	1·0	0·8	0·5	0·3	0·1	0·2	12
16	2·8	2·7	2·6	2·5	2·4	2·3	2·1	1·9	1·6	1·3	1·0	0·7	0·4	0·1	0·3	16
20	3·5	3·4	3·3	3·2	3·0	2·8	2·6	2·3	2·0	1·6	1·3	0·9	0·5	0·1	0·3	20

Periods of complete Years.	July.					August.					September.					Periods of complete Years.
	Days.					Days.					Days.					
	1	7	13	19	25	1	7	13	19	25	1	7	13	19	25	
	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	Add	
	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	
4	0·1	0·2	0·3	0·4	0·4	0·5	0·5	0·6	0·6	0·7	0·7	0·7	0·7	0·7	0·7	4
8	0·3	0·4	0·6	0·7	0·9	1·0	1·1	1·2	1·3	1·3	1·4	1·4	1·4	1·4	1·4	8
12	0·4	0·7	0·9	1·1	1·3	1·5	1·6	1·8	1·9	2·0	2·0	2·1	2·1	2·1	2·1	12
16	0·6	0·9	1·2	1·4	1·7	2·0	2·2	2·4	2·5	2·6	2·7	2·8	2·8	2·9	2·9	16
20	0·7	1·1	1·5	1·8	2·2	2·5	2·7	3·0	3·2	3·3	3·4	3·5	3·5	3·6	3·6	20

Periods of complete Years.	October.					November.					December.					Periods of complete Years.
	Days.					Days.					Days.					
	1	7	13	19	25	1	7	13	19	25	1	7	13	19	25	
	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	Sub.	
	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	
4	0·7	0·7	0·7	0·6	0·6	0·5	0·5	0·4	0·4	0·3	0·2	0·2	0·1	0·0	0·0	4
8	1·4	1·4	1·3	1·3	1·3	1·1	1·0	0·9	0·8	0·7	0·5	0·4	0·2	0·0	0·1	8
12	2·1	2·0	2·0	1·9	1·8	1·6	1·5	1·3	1·2	1·0	0·7	0·5	0·3	0·1	0·1	12
16	2·8	2·7	2·6	2·5	2·4	2·2	2·0	1·8	1·5	1·3	1·0	0·7	0·4	0·1	0·2	16
20	3·5	3·4	3·3	3·2	3·0	2·8	2·5	2·2	2·0	1·7	1·3	0·9	0·5	0·2	0·3	20

EXAMPLES FOR THE USE OF THE ABOVE TABLE.

1. What will be the Sun's Declination, May 13, 1856, for noon, at Greenwich?

Declination, May 13, Table XXII.................... 18° 29′ 0″ N.
May 13th, for 12 years, is 1′·4 .... = + 1.24

Declination at Greenwich, May 13, 1856 .... 18.30.24 N.

2. What will be the Sun's Declination, August 27, 1863, for noon, at Greenwich?

Declination, August 27, Table XXI.................. 10.13. 0 N.
August 27th, for 20 years, is 3′·3................. = − 3.18

Answer............ 10. 9.42 N.

TABLE XXVII.

For reducing the Time of the Moon's Passage over the Meridian of Greenwich to the Time of its Passage over any other Meridian.

Daily Variation of the Moon's passing over the Meridian.

Ship's Long.	m 40	m 42	m 44	m 46	m 48	m 50	m 52	m 54	m 56	m 58	m 60	m 62	m 64	m 66	Time fr. ☽'s Sou.
°	m	m	m	m	m	m	m	m	m	m	m	m	m	m	h m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0. 0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.20
10	1	1	1	1	1	1	1	1	1	2	2	2	2	2	0.40
15	2	2	2	2	2	2	2	2	2	2	2	2	3	3	1. 0
20	2	2	2	2	3	3	3	3	3	3	3	3	3	4	1.20
25	3	3	3	3	3	3	3	4	4	4	4	4	4	4	1.40
30	3	3	4	4	4	4	4	4	4	5	5	5	5	5	2. 0
35	4	4	4	4	5	5	5	5	5	5	6	6	6	6	2.20
40	4	4	5	5	5	5	6	6	6	6	6	7	7	7	2.40
45	5	5	5	6	6	6	6	7	7	7	7	7	8	8	3. 0
50	5	6	6	6	6	7	7	7	7	8	8	8	9	9	3.20
55	6	6	7	7	7	7	8	8	8	9	9	9	9	10	3.40
60	6	7	7	7	8	8	8	9	9	9	10	10	10	11	4. 0
65	7	7	8	8	8	9	9	9	10	10	10	11	11	11	4.20
70	7	8	8	9	9	9	10	10	10	11	11	12	12	12	4.40
75	8	9	9	9	10	10	10	11	11	12	12	12	13	13	5. 0
80	9	9	9	10	10	11	11	12	12	12	13	13	14	14	5.20
85	9	10	10	11	11	11	12	12	13	13	14	14	14	15	5.40
90	10	10	11	11	12	12	13	13	13	14	14	15	15	16	6. 0
95	10	11	11	12	12	13	13	14	14	15	15	16	16	17	6.20
100	11	11	12	12	13	13	14	14	15	15	16	17	17	18	6.40
105	11	12	12	13	14	14	15	15	16	16	17	17	18	18	7. 0
110	12	12	13	14	14	15	15	16	16	17	18	18	19	19	7.20
115	12	13	14	14	15	15	16	17	17	18	18	19	20	20	7.40
120	13	14	14	15	15	16	17	17	18	19	19	20	20	21	8. 0
125	13	14	15	15	16	17	17	18	19	19	20	21	21	22	8.20
130	14	15	15	16	17	17	18	19	19	20	21	21	22	23	8.40
135	14	15	16	17	17	18	19	20	20	21	22	22	23	24	9. 0
140	15	16	17	17	18	19	20	20	21	22	22	23	24	25	9.20
145	15	16	17	18	19	19	20	21	22	22	23	24	25	25	9.40
150	16	17	18	19	19	20	21	22	22	23	24	25	26	26	10. 0
155	16	18	18	19	20	21	22	22	23	24	25	26	26	27	10.20
160	17	18	19	20	21	21	22	23	24	25	26	26	27	28	10.40
165	17	19	20	20	21	22	23	24	25	26	26	27	28	29	11. 0
170	18	19	20	21	22	23	24	25	25	26	27	28	29	30	11.20
175	18	20	21	22	23	23	24	25	26	27	28	29	30	31	11.40
180	19	20	21	22	23	24	25	26	27	28	29	30	31	32	12. 0

EXPLANATION OF THE ABOVE TABLE.

" As the Moon passes the meridian of any place later every day than she did the day before, by a number of minutes, which is equal to the difference of the variation of the Sun and Moon's right ascensions in time, in the interval, it is obvious, that the Moon must pass the meridians of such places as lie to the westward of Greenwich later, and the meridians of such places as are to the eastward of Greenwich sooner, than she passes the meridian of Greenwich by a number of minutes, which is to the number of minutes in the above-mentioned difference, as the distance of that meridian from the meridian of Greenwich is to 360°. And because it is frequently of use at sea to know the time of the Moon's passage over the meridian, usually called her southing; the time by which she passes the meridian of any place, before or after the time when she passes the meridian of Greenwich, is inserted in this Table. The Table is to be entered at the top with the daily variation of the Moon's passing the meridian,[*] and in the left-hand side column, with the longitude of the ship or place: under the former, and opposite the latter, stands a number, which being added to the time of the Moon's passing the meridian of Greenwich, if the longitude be west, or subtracted from it, if the longitude be east, will give the time of its passage over the meridian of the given place."

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[*] The daily variation of the Moon's passing the meridian is found by taking the difference between the time of the Moon's passage over the meridian of Greenwich on the proposed day and the day following, if the longitude of the ship or place be west; or between the time of her passage on the proposed day and that preceding it, if the longitude of the ship or place be east.

TABLE XXVIII.

The Passage of Venus over the Meridian of Greenwich, in Mean Time, and its Declination, for 1843.

Days.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P
	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M.	° '	H. M	° '	H. M.	° '	H. M.	° '	H. M.
1	S 18.31	22.33	S 18.21	21.10	S 18.40	21. 6	S 12.27	21.21	S 0.48	21.34	N 12.31	21.49	N 21.33	22.17	N 22. 1	22.58	N 12.40	23.31	S 1.42	23.51	S 16.14	0.15	S 24. 2	0.54
2	18.21	22.28	18.25	21. 9	18.35	21. 6	12. 7	21.21	0.22	21.34	12.55	21.50	21.43	22.19	21.51	22.59	12.15	23.32	2.12	23.52	16.37	0.16	24. 8	0.55
3	18.13	22.23	18.29	21. 9	18.29	21. 6	11.48	21.22	N 0. 5	21.34	13.18	21.50	21.53	22.20	21.41	23. 1	11.49	23.33	2.43	23.53	17. 0	0.17	24.13	0.57
4	18. 5	22.19	18.33	21. 8	18.23	21. 7	11.28	21.22	0.31	21.35	13.41	21.51	22. 2	22.21	21.30	23. 2	11.23	23.33	3.13	23.53	17.23	0.18	24.17	0.58
5	17.58	22.14	18.36	21. 7	18.17	21. 7	11. 8	21.23	0.57	21.35	14. 4	21.52	22.11	22.22	21.18	23. 3	10.57	23.34	3.43	23.54	17.45	0.19	24.20	1. 0
6	17.52	22.10	18.40	21. 7	18.10	21. 8	10.47	21.23	1.24	21.36	14.26	21.53	22.19	22.24	21. 6	23. 4	10.30	23.35	4.13	23.55	18. 7	0.20	24.22	1. 1
7	17.47	22. 6	18.43	21. 6	18. 3	21. 8	10.26	21.24	1.50	21.36	14.48	21.53	22.27	22.25	20.54	23. 6	10. 3	23.36	4.43	23.55	18.28	0.21	24.24	1. 3
8	17.43	22. 2	18.47	21. 6	17.55	21. 9	10. 5	21.24	2.17	21.36	15.10	21.54	22.33	22.26	20.40	23. 7	9.36	23.36	5.14	23.56	18.49	0.22	24.25	1. 5
9	17.39	21.58	18.50	21. 5	17.47	21. 9	9.44	21.24	2.43	21.37	15.31	21.55	22.40	22.27	20.26	23. 8	9. 8	23.37	5.43	23.57	19. 9	0.23	24.26	1. 6
10	17.36	21.55	18.52	21. 5	17.38	21. 9	9.22	21.25	3.10	21.37	15.52	21.56	22.45	22.29	20.12	23. 9	8.40	23.38	6.13	23.57	19.29	0.25	24.25	1. 8
11	17.33	21.52	18.55	21. 4	17.29	21.10	9. 0	21.25	3.36	21.38	16.13	21.57	22.50	22.30	19.56	23.10	8.12	23.39	6.43	23.58	19.48	0.26	24.24	1. 9
12	17.32	21.48	18.57	21. 4	17.19	21.10	8.37	21.26	4. 3	21.38	16.33	21.58	22.55	22.31	19.41	23.11	7.44	23.39	7.12	23.59	20. 7	0.27	24.22	1.11
13	17.31	21.45	18.59	21. 4	17. 9	21.11	8.14	21.26	4.29	21.39	16.53	21.58	22.58	22.33	19.24	23.13	7.15	23.40	7.42	23.59	20.25	0.28	24.19	1.12
14	17.30	21.42	19. 1	21. 4	16.58	21.11	7.51	21.27	4.56	21.39	17.13	21.59	23. 1	22.34	19. 8	23.14	6.47	23.41	8.11		20.43	0.30	24.16	1.14
15	17.30	21.40	19. 2	21. 4	16.47	21.12	7.28	21.27	5.22	21.40	17.32	22. 0	23. 4	22.35	18.50	23.15	6.18	23.41	8.40	0. 0	20.59	0.31	24.11	1.15
16	17.31	21.37	19. 3	21. 4	16.35	21.12	7. 5	21.27	5.48	21.40	17.50	22. 1	23. 5	22.37	18.32	23.16	5.48	23.42	9. 9	0. 1	21.16	0.32	24. 6	1.17
17	17.32	21.34	19. 4	21. 4	16.23	21.13	6.41	21.28	6.15	21.40	18. 9	22. 2	23. 6	22.38	18.14	23.17	5.19	23.43	9.38	0. 2	21.32	0.33	24. 1	1.18
18	17.33	21.32	19. 4	21. 4	16.11	21.13	6.17	21.28	6.41	21.41	18.26	22. 3	23. 7	22.39	17.55	23.18	4.50	23.43	10. 6	0. 2	21.47	0.35	23.54	1.20
19	17.35	21.30	19. 4	21. 4	15.57	21.14	5.53	21.29	7. 7	21.41	18.44	22. 4	23. 6	22.41	17.35	23.19	4.20	23.44	10.34	0. 3	22. 1	0.36	23.47	1.21
20	17.37	21.28	19. 3	21. 4	15.44	21.14	5.28	21.29	7.33	21.42	19. 1	22. 5	23. 5	22.42	17.15	23.20	3.50	23.45	11. 2	0. 4	22.15	0.38	23.39	1.23
21	17.40	21.26	19. 2	21. 4	15.30	21.15	5. 3	21.29	7.59	21.42	19.17	22. 6	23. 3	22.43	16.55	23.21	3.21	23.45	11.30	0. 5	22.28	0.39	23.30	1.24
22	17.43	21.24	19. 1	21. 4	15.15	21.15	4.39	21.30	8.24	21.43	19.33	22. 7	23. 1	22.45	16.34	23.22	2.51	23.46	11.57	0. 5	22.41	0.40	23.21	1.26
23	17.46	21.22	18.59	21. 4	15. 0	21.16	4.14	21.30	8.50	21.44	19.48	22. 8	22.58	22.46	16.12	23.23	2.21	23.46	12.24	0. 6	22.53	0.42	23.11	1.27
24	17.50	21.20	18.57	21. 4	14.45	21.17	3.49	21.31	9.15	21.44	20. 3	22. 9	22.54	22.47	15.50	23.24	1.50	23.47	12.51	0. 7	23. 4	0.43	23. 0	1.29
25	17.53	21.19	18.54	21. 5	14.29	21.17	3.23	21.31	9.40	21.45	20.18	22.10	22.50	22.49	15.28	23.25	1.20	23.48	13.18	0. 8	23.14	0.45	22.48	1.30
26	17.57	21.17	18.51	21. 5	14.13	21.18	2.58	21.32	10. 5	21.45	20.31	22.12	22.45	22.50	15. 5	23.26	0.50	23.48	13.44	0. 9	23.24	0.46	22.36	1.32
27	18. 1	21.16	18.48	21. 5	13.56	21.18	2.32	21.32	10.30	21.46	20.45	22.13	22.39	22.52	14.42	23.27	0.20	23.49	14.10	0.10	23.33	0.48	22.23	1.33
28	18. 5	21.15	S 18.44	21. 5	13.39	21.19	2. 6	21.32	10.55	21.46	20.58	22.14	22.33	22.53	14.19	23.28	S 0.11	23.50	14.35	0.11	23.42	0.49	22.10	1.34
29	18. 9	21.13			13.22	21.19	1.40	21.33	11.19	21.47	21.10	22.15	22.26	22.54	13.55	23.29	0.41	23.50	15. 1	0.12	23.49	0.51	21.56	1.36
30	18.13	21.12			13. 4	21.20	S 1.14	21.33	11.44	21.48	N 21.21	22.16	22.18	22.55	13.30	23.29	1.12	23.51	15.25	0.13	S 23.56	0.52	21.41	1.37
	S 18.17	21.11			S 12.45	21.20			N 12. 8	21.48			N 22.10	22.57	N 13. 6	23.30			S 15.50	0.14			S 21.25	1.38

TABLE XXIX.

The Passage of Venus over the Meridian of Greenwich, in Mean Time, and its Declination, for 1844.

Days.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dec.	M.P.	D c .	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M. P.
	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	° ′	° ′	H. M.
1	S 21. 9	1.40	S 8.45	2. 9	N 6.15	2.23	N 20. 6	2.41	N 26.23	3. 4	N 23.43	3. 9	N 16.48	2. 6	N 14. 3	22.59	N 15.39	21.12	N 12.47	20.55	N 3. 0	21. 1	S 9.40	21.15
2	20.53	1.41	8.15	2. 9	6.46	2.24	20.26	2.42	26.26	3. 5	23.31	3. 9	16.36	2. 1	14. 5	22.54	15.39	21.11	12.34	20.55	2.36	21. 2	10. 5	21.16
3	20.35	1.42	7.45	2.10	7.16	2.24	20.47	2.42	26.29	3. 6	23.19	3. 8	16.24	1.57	14. 7	22.48	15.39	21.10	12.21	20.55	2.11	21. 2	10.30	21.16
4	20.17	1.43	7.15	2.11	7.47	2.25	21. 6	2.43	26.30	3. 6	23. 6	3. 7	16.13	1.53	14.10	22.43	15.39	21. 8	12. 7	20.55	1.47	21. 2	10.55	21.17
5	19.59	1.45	6.45	2.11	8.17	2.25	21.26	2.44	26.32	3. 7	22.53	3. 6	16. 1	1.48	14.13	22.37	15.39	21. 7	11.53	20.55	1.22	21. 3	11.19	21.18
6	19.40	1.46	6.14	2.12	8.47	2.26	21.44	2.45	26.32	3. 8	22.40	3. 5	15.51	1.43	14.16	22.32	15.38	21. 6	11.38	20.55	0.58	21. 3	11.43	21.19
7	19.20	1.47	5.44	2.12	9.17	2.26	22. 3	2.45	26.33	3. 8	22.26	3. 4	15.40	1.38	14.19	22.27	15.36	21. 5	11.23	20.55	0.33	21. 3	12. 7	21.19
8	19. 0	1.48	5.13	2.13	9.46	2.27	22.20	2.46	26.32	3. 9	22.12	3. 3	15.30	1.23	14.23	22.23	15.35	21. 4	11. 7	20.56	N 0. 8	21. 4	12.30	21.20
9	18.39	1.49	4.42	2.13	10.16	2.27	22.37	2.47	26.31	3. 9	21.59	3. 2	15.21	1.28	14.26	22.18	15.32	21. 3	10.51	20.56	S 0.17	21. 4	12.54	21.21
10	18.18	1.50	4.11	2.14	10.45	2.27	22.54	2.48	26.29	3.10	21.45	3. 0	15.12	1.23	14.30	22.13	15.30	21. 2	10.34	20.56	0.43	21. 4	13.17	21.22
11	17.56	1.51	3.40	2.14	11.14	2.28	23.10	2.48	26.27	3.10	21.30	2.59	15. 3	1.17	14.34	22. 9	15.27	21. 1	10.17	20.56	1. 8	21. 5	13.40	21.23
12	17.34	1.52	3. 9	2.15	11.43	2.28	23.25	2.49	26.24	3.11	21.16	2.57	14.55	1.11	14.38	22. 5	15.23	21. 1	10. 0	20.56	1.34	21. 5	14. 2	21.23
13	17.11	1.53	2.38	2.15	12.11	2.29	23.40	2.50	26.21	3.11	21. 2	2.56	14.48	1. 5	14.42	22. 1	15.19	21. 0	9.42	20.56	1.59	21. 6	14.25	21.24
14	16.48	1.54	2. 6	2.16	12.39	2.29	23.54	2.51	26.17	3.11	20.47	2.54	14.41	1. 0	14.46	21.57	15.15	20.59	9.24	20.56	2.25	21. 6	14.47	21.25
15	16.25	1.55	1.35	2.16	13. 7	2.30	24. 8	2.52	26.12	3.12	20.33	2.52	14.34	0.53	14.50	21.54	15.10	20.59	9. 6	20.57	2.51	21. 6	15. 8	21.26
16	16. 0	1.56	1. 3	2.17	13.35	2.31	24.21	2.53	26. 7	3.12	20.18	2.50	14.28	0.47	14.54	21.50	15. 5	20.58	8.47	20.57	3.16	21. 7	15.29	21.27
17	15.36	1.57	0.32	2.17	14. 2	2.31	24.33	2.53	26. 2	3.12	20. 3	2.48	14.23	0.41	14.58	21.47	14.59	20.58	8.27	20.57	3.42	21. 7	15.50	21.28
18	15.11	1.58	0. 0	2.18	14.29	2.32	24.45	2.54	25.56	3.12	19.49	2.46	14.18	0.35	15. 2	21.44	14.52	20.58	8. 8	20.57	4. 8	21. 8	16.11	21.29
19	14.46	1.59	N 0.31	2.18	14.55	2.32	24.57	2.55	25.49	3.13	19.34	2.44	14.14	0.28	15. 6	21.41	14.46	20.57	7.48	20.58	4.34	21. 8	16.31	21.30
20	14.20	2. 0	1. 3	2.19	15.22	2.33	25. 7	2.56	25.42	3.13	19.19	2.41	14.10	0.22	15.10	21.38	14.38	20.57	7.27	20.58	5. 0	21. 9	16.51	21.31
21	13.54	2. 1	1.34	2.19	15.48	2.33	25.17	2.57	25.34	3.13	19. 5	2.39	14. 7	0.15	15.13	21.35	14.31	20.56	7. 7	20.58	5.26	21. 9	17.10	21.32
22	13.27	2. 2	2. 6	2.20	16.13	2.34	25.27	2.57	25.26	3.13	18.50	2.36	14. 4	0. 9	15.17	21.32	14.23	20.56	6.46	20.58	5.51	21.10	17.29	21.33
23	13. 0	2. 2	2.37	2.20	16.38	2.35	25.35	2.58	25.18	3.13	18.36	2.33	14. 2	{0. 2 23.56	15.20	21.30	14.14	20.56	6.24	20.59	6.17	21.10	17.48	21.34
24	12.33	2. 3	3. 8	2.21	17. 3	2.35	25.44	2.59	25. 9	3.13	18.22	2.30	14. 0	23.49	15.23	21.27	14. 5	20.56	6. 3	20.59	6.43	21.11	18. 6	21.35
25	12. 6	2. 4	3.40	2.21	17.27	2.36	25.51	3. 0	25. 0	3.12	18. 8	2.27	13.59	23.42	15.26	21.25	13.55	20.56	5.41	20.59	7. 9	21.11	18.23	21.36
26	11.38	2. 5	4.11	2.21	17.51	2.37	25.58	3. 1	24.50	3.12	17.54	2.24	13.58	23.36	15.29	21.23	13.45	20.55	5.19	20.59	7.34	21.12	18.40	21.37
27	11.10	2. 5	4.42	2.22	18.15	2.37	26. 4	3. 1	24.40	3.12	17.40	2.21	13.58	23.30	15.31	21.21	13.34	20.55	4.56	21. 0	8. 0	21.13	18.57	21.38
28	10.41	2. 6	5.13	2.22	18.38	2.38	26.10	3. 2	24.29	3.12	17.27	2.17	13.58	23.23	15.33	21.19	13.23	20.55	4.33	21. 0	8.25	21.13	19.13	21.40
29	10.12	2. 7	N 5.44	2.23	19. 1	2.39	26.15	3. 3	24.18	3.11	17.14	2.13	13.59	23.17	15.35	21.17	13.12	20.55	4.10	21. 0	8.50	21.14	19.29	21.41
30	9.43	2. 8			19.23	2.39	N 26.19	3. 4	24. 7	3.11	N 17. 1	2.10	14. 0	23.11	15.37	21.16	N 13. 0	20.55	3.47	21. 1	S 9.15	21.14	19.44	21.42
31	S 9.14	2. 8			N 19.44	2.40			N 23.55	3.10			N 14. 1	23. 5	N 15.38	21.14			N 3.23	21. 1			S 19.59	21.43

TABLE XXX.

The Passage of Venus over the Meridian of Greenwich, in Mean Time, and its Declination for 1845.

Days.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dec.	M. P.	Dec.	M.P	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.
	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.
1	S 20. 13	21. 44	S 22. 16	22. 27	S 15. 17	23. 1	S 1. 22	23. 24	N 12. 56	23. 44	N 22. 47	0. 16	N 22. 50	0. 58	N 12. 54	1. 31	S 2. 25	1. 48	S 16. 47	2. 5	S 25. 24	2. 38	S 23. 39	3. 11
2	20. 26	21. 46	22. 10	22. 29	14. 55	23. 2	0. 53	23. 25	13. 22	23. 45	22. 57	0. 18	22. 39	1. 0	12. 27	1. 31	2. 56	1. 48	17. 12	2. 6	25. 31	2. 39	23. 25	3. 12
3	20. 39	21. 47	22. 2	22. 30	14. 32	23. 3	S 0. 23	23. 25	13. 47	23. 45	23. 7	0. 19	22. 28	1. 1	12. 1	1. 32	3. 27	1. 49	17. 36	2. 7	25. 37	2. 40	23. 11	3. 13
4	20. 51	21. 48	21. 54	22. 32	14. 9	23. 4	N 0. 7	23. 26	14. 12	23. 46	23. 15	0. 20	22. 16	1. 2	11. 33	1. 33	3. 57	1. 49	18. 0	2. 8	25. 42	2. 41	22. 56	3. 13
5	21. 3	21. 49	21. 45	22. 33	13. 45	23. 5	0. 37	23. 26	14. 37	23. 47	23. 24	0. 22	22. 3	1. 4	11. 6	1. 34	4. 28	1. 50	18. 23	2. 8	25. 47	2. 42	22. 40	3. 14
6	21. 14	21. 51	21. 36	22. 34	13. 21	23. 6	1. 6	23. 27	15. 1	23. 48	23. 31	0. 23	21. 50	1. 5	10. 38	1. 34	4. 59	1. 50	18. 46	2. 9	25. 51	2. 44	22. 24	3. 15
7	21. 25	21. 52	21. 26	22. 36	12. 56	23. 7	1. 36	23. 28	15. 25	23. 49	23. 38	0. 24	21. 36	1. 6	10. 10	1. 35	5. 30	1. 51	19. 8	2. 10	25. 54	2. 45	22. 8	3. 15
8	21. 35	21. 53	21. 15	22. 37	12. 32	23. 7	2. 6	23. 28	15. 48	23. 50	23. 44	0. 26	21. 21	1. 7	9. 42	1. 36	6. 0	1. 51	19. 30	2. 11	25. 56	2. 46	21. 51	3. 16
9	21. 44	21. 55	21. 4	22. 38	12. 6	23. 8	2. 35	23. 29	16. 11	23. 51	23. 50	0. 27	21. 6	1. 9	9. 13	1. 36	6. 31	1. 52	19. 51	2. 12	25. 58	2. 47	21. 33	3. 16
10	21. 53	21. 56	20. 52	22. 40	11. 41	23. 9	3. 5	23. 29	16. 34	23. 52	23. 54	0. 29	20. 50	1. 10	8. 45	1. 37	7. 1	1. 52	20. 12	2. 13	25. 59	2. 49	21. 15	3. 17
11	22. 1	21. 57	20. 39	22. 41	11. 15	23. 10	3. 35	23. 30	16. 56	23. 53	23. 58	0. 30	20. 34	1. 11	8. 16	1. 37	7. 31	1. 53	20. 32	2. 14	25. 59	2. 50	20. 57	3. 17
12	22. 8	21. 59	20. 26	22. 42	10. 49	23. 11	4. 4	23. 31	17. 18	23. 54	24. 2	0. 32	20. 17	1. 12	7. 46	1. 38	8. 1	1. 53	20. 52	2. 15	25. 59	2. 51	20. 38	3. 18
13	22. 15	22. 0	20. 12	22. 43	10. 23	23. 11	4. 34	23. 31	17. 40	23. 55	24. 4	0. 33	20. 0	1. 13	7. 17	1. 38	8. 31	1. 54	21. 12	2. 16	25. 57	2. 52	20. 18	3. 18
14	22. 21	22. 2	19. 58	22. 45	9. 56	23. 12	5. 3	23. 32	18. 1	23. 56	24. 6	0. 34	19. 42	1. 14	6. 47	1. 39	9. 1	1. 54	21. 30	2. 17	25. 56	2. 54	19. 58	3. 18
15	22. 27	22. 3	19. 43	22. 46	9. 29	23. 13	5. 32	23. 32	18. 21	23. 57	24. 7	0. 36	19. 23	1. 15	6. 18	1. 40	9. 30	1. 55	21. 49	2. 18	25. 53	2. 55	19. 38	3. 19
16	22. 32	22. 5	19. 27	22. 47	9. 2	23. 14	6. 1	23. 33	18. 41	23. 58	24. 8	0. 37	19. 4	1. 16	5. 48	1. 40	10. 0	1. 55	22. 6	2. 19	25. 50	2. 56	19. 18	3. 19
17	22. 36	22. 6	19. 11	22. 48	8. 35	23. 14	6. 30	23. 34	19. 1	23. 59	24. 8	0. 39	18. 44	1. 17	5. 18	1. 41	10. 29	1. 56	22. 23	2. 20	25. 46	2. 57	18. 57	3. 19
18	22. 39	22. 7	18. 55	22. 50	8. 7	23. 15	6. 59	23. 34	19. 20		24. 7	0. 40	18. 24	1. 18	4. 47	1. 41	10. 58	1. 56	22. 40	2. 21	25. 41	2. 58	18. 35	3. 20
19	22. 42	22. 9	18. 37	22. 51	7. 39	23. 16	7. 28	23. 35	19. 38	0. 0	24. 5	0. 42	18. 3	1. 19	4. 17	1. 42	11. 26	1. 57	22. 56	2. 22	25. 35	2. 59	18. 13	3. 20
20	22. 44	22. 10	18. 20	22. 52	7. 11	23. 16	7. 56	23. 36	19. 56	0. 1	24. 3	0. 43	17. 42	1. 20	3. 47	1. 42	11. 55	1. 58	23. 11	2. 23	25. 29	3. 0	17. 51	3. 20
21	22. 46	22. 12	18. 1	22. 53	6. 43	23. 17	8. 25	23. 36	20. 14	0. 2	24. 0	0. 45	17. 21	1. 21	3. 16	1. 43	12. 23	1. 58	23. 26	2. 24	25. 23	3. 1	17. 29	3. 20
22	22. 47	22. 13	17. 43	22. 54	6. 14	23. 18	8. 53	23. 37	20. 30	0. 4	23. 56	0. 46	16. 58	1. 22	2. 45	1. 43	12. 51	1. 59	23. 40	2. 26	25. 15	3. 2	17. 6	3. 20
23	22. 47	22. 15	17. 23	22. 55	5. 46	23. 18	9. 21	23. 38	20. 47	0. 5	23. 51	0. 47	16. 36	1. 23	2. 14	1. 44	13. 18	2. 0	23. 53	2. 27	25. 7	3. 4	16. 43	3. 20
24	22. 46	22. 16	17. 3	22. 56	5. 17	23. 19	9. 49	23. 38	21. 2	0. 6	23. 46	0. 49	16. 13	1. 24	1. 44	1. 44	13. 46	2. 0	24. 6	2. 28	24. 58	3. 5	16. 20	3. 20
25	22. 45	22. 18	16. 43	22. 57	4. 48	23. 20	10. 16	23. 39	21. 18	0. 7	23. 40	0. 50	15. 49	1. 25	1. 13	1. 45	14. 13	2. 1	24. 18	2. 29	24. 49	3. 6	15. 56	3. 19
26	22. 43	22. 19	16. 22	22. 58	4. 19	23. 20	10. 43	23. 40	21. 32	0. 9	23. 33	0. 52	15. 25	1. 26	0. 42	1. 45	14. 39	2. 1	24. 30	2. 30	24. 39	3. 6	15. 32	3. 19
27	22. 40	22. 20	16. 1	22. 59	3. 50	23. 21	11. 11	23. 41	21. 46	0. 10	23. 26	0. 53	15. 1	1. 27	N 0. 11	1. 45	15. 6	2. 2	24. 40	2. 31	24. 28	3. 7	15. 8	3. 19
28	22. 37	22. 22	S 15. 40	23. 0	3. 20	23. 22	11. 37	23. 41	22. 0	0. 11	23. 18	0. 54	14. 36	1. 28	S 0. 20	1. 46	15. 32	2. 3	24. 51	2. 33	24. 17	3. 8	14. 44	3. 19
29	22. 33	22. 23			2. 51	23. 22	12. 4	23. 42	22. 12	0. 12	23. 9	0. 56	14. 11	1. 28	0. 51	1. 46	15. 57	2. 4	25. 0	2. 34	24. 5	3. 9	14. 20	3. 18
30	22. 28	22. 25			2. 22	23. 23	N 12. 30	23. 43	22. 24	0. 14	N 23. 0	0. 57	13. 46	1. 29	1. 23	1. 47	S 16. 23	2. 4	25. 9	2. 35	S 23. 52	3. 10	13. 55	3. 18
31	S 22. 22	22. 26			S 1. 52	23. 23			N 22. 36	0. 15			N 13. 20	1. 30	S 1. 54	1. 47			S 25. 17	2. 36			S 13. 30	3. 18

TABLE XXXI.

The Passage of Venus over the Meridian of Greenwich, in Mean Time, and its Declination, for 1846.

Days.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.	Dec.	M.P.
	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.	° ′	H. M.
1	S 13. 5	3.17	S 0.44	2.26	N 1.22	0. 8	S 5.20	21.43	S 2. 6	21.6	N 7.53	21. 1	N 17.46	21.13	N 22.22	21.44	N 17.39	22.19	N 5.38	22.43	S 9.28	23. 4	S 20.52	23.36
2	12.40	3.16	0.26	2.23	1.10	0. 1 23.55	5.24	21.40	1.51	21.5	8.14	21. 1	18. 2	21.14	22.22	21.45	17.21	22.20	5. 9	22.44	9.56	23. 5	21. 8	23.37
3	12.15	3.16	0. 8	2.20	0.56	23.49	5.27	21.38	1.35	21.5	8.36	21. 1	18.17	21.15	22.22	21.46	17. 2	22.21	4.40	22.45	10.24	23. 6	21.22	23.39
4	11.49	3.15	N 0. 9	2.17	0.42	23.43	5.29	21.36	1.19	21.4	8.57	21. 1	18.33	21.15	22.20	21.48	16.43	22.22	4.12	22.45	10.51	23. 7	21.36	23.40
5	11.24	3.15	0.25	2.13	0.26	23.37	5.30	21.34	1. 3	21.4	9.19	21. 1	18.47	21.16	22.19	21.49	16.23	22.23	3.43	22.46	11.18	23. 7	21.50	23.41
6	10.59	3.14	0.41	2. 9	0.11	23.31	5.30	21.32	0.46	21.4	9.40	21. 2	19. 2	21.17	22.16	21.50	16. 3	22.24	3.13	22.47	11.45	23. 8	22. 3	23.43
7	10.33	3.13	0.55	2. 5	S 0. 6	23.25	5.30	21.30	0.29	21.3	10. 1	21. 2	19.16	21.18	22.13	21.51	15.42	22.25	2.44	22.47	12.12	23. 9	22.15	23.44
8	10. 8	3.12	1. 9	2. 1	0.22	23.19	5.29	21.29	0.12	21.3	10.23	21. 2	19.29	21.19	22. 9	21.52	15.21	22.26	2.15	22.48	12.38	23.10	22.26	23.46
9	9.42	3.11	1.22	1.57	0.39	23.13	5.27	21.27	N 0. 6	21.3	10.44	21. 2	19.43	21.20	22. 5	21.54	15. 0	22.27	1.45	22.48	13. 4	23.11	22.37	23.47
10	9.17	3.10	1.33	1.53	0.56	23. 8	5.25	21.25	0.24	21.2	11. 5	21. 3	19.55	21.21	22. 0	21.55	14.38	22.28	1.16	22.49	13.30	23.12	22.47	23.49
11	8.51	3. 9	1.44	1.49	1.13	23. 2	5.22	21.24	0.42	21.2	11.26	21. 3	20. 7	21.21	21.54	21.56	14.15	22.29	0.46	22.50	13.55	23.13	22.57	23.50
12	8.26	3. 8	1.54	1.44	1.30	22.57	5.18	21.22	1. 1	21.2	11.47	21. 3	20.19	21.22	21.48	21.57	13.53	22.29	0.17	22.50	14.20	23.14	23. 6	23.52
13	8. 0	3. 6	2. 2	1.39	1.47	22.52	5.13	21.21	1.20	21.2	12. 8	21. 4	20.31	21.23	21.41	21.58	13.29	22.30	S 0.13	22.51	14.45	23.15	23.14	23.53
14	7.35	3. 5	2. 9	1.34	2. 3	22.47	5. 8	21.20	1.39	21.1	12.28	21. 4	20.41	21.24	21.34	21.59	13. 6	22.31	0.43	22.52	15. 9	23.16	23.21	23.55
15	7.10	3. 4	2.15	1.29	2.20	22.42	5. 2	21.19	1.58	21.1	12.49	21. 4	20.52	21.25	21.26	22. 1	12.42	22.32	1.12	22.52	15.33	23.17	23.28	23.56
16	6.45	3. 2	2.20	1.24	2.36	22.37	4.55	21.17	2.18	21.1	13. 9	21. 5	21. 1	21.26	21.17	22. 2	12.18	22.33	1.42	22.53	15.56	23.18	23.34	23.58
17	6.20	3. 1	2.23	1.19	2.51	22.33	4.48	21.16	2.38	21.1	13.29	21. 5	21.11	21.27	21. 8	22. 3	11.53	22.33	2.12	22.54	16.20	23.19	23.39	23.59
18	5.55	2.59	2.25	1.14	3. 6	22.28	4.40	21.15	2.58	21.1	13.49	21. 6	21.19	21.28	20.58	22. 4	11.28	22.34	2.41	22.54	16.42	23.20	23.44	
19	5.31	2.57	2.26	1. 8	3.20	22.24	4.31	21.14	3.18	21.1	14. 9	21. 6	21.28	21.29	20.48	22. 5	11. 3	22.35	3.11	22.55	17. 4	23.21	23.47	0. 1
20	5. 7	2.56	2.26	1. 2	3.34	22.20	4.22	21.13	3.39	21.1	14.29	21. 7	21.35	21.30	20.36	22. 6	10.37	22.36	3.41	22.56	17.26	23.22	23.51	0. 2
21	4.43	2.54	2.24	0.56	3.47	22.16	4.12	21.13	3.59	21.0	14.48	21. 7	21.42	21.31	20.25	22. 8	10.11	22.36	4.10	22.56	17.47	23.23	23.53	0. 4
22	4.19	2.52	2.21	0.51	3.59	22.12	4. 2	21.12	4.20	21.0	15. 7	21. 8	21.49	21.33	20.12	22. 9	9.45	22.37	4.40	22.57	18. 8	23.25	23.54	0. 6
23	3.56	2.50	2.16	0.45	4.11	22. 9	3.51	21.11	4.41	21.0	15.26	21. 8	21.55	21.34	20. 0	22.10	9.18	22.38	5. 9	22.58	18.29	23.26	23.55	0. 7
24	3.33	2.48	2.10	0.39	4.22	22. 5	3.40	21.10	5. 2	21.0	15.44	21. 9	22. 0	21.35	19.46	22.11	8.52	22.39	5.38	22.58	18.49	23.27	23.55	0. 9
25	3.10	2.45	2. 3	0.32	4.32	22. 2	3.28	21. 9	5.23	21.0	16. 3	21. 9	22. 5	21.36	19.32	22.12	8.25	22.39	6. 8	22.59	19. 8	23.28	23.55	0.10
26	2.48	2.43	1.55	0.26	4.41	21.59	3.15	21. 9	5.44	21.0	16.21	21.10	22. 9	21.37	19.18	22.13	7.57	22.40	6.37	23. 0	19.27	23.29	23.53	0.12
27	2.26	2.41	1.45	0.20	4.50	21.56	3. 2	21. 8	6. 5	21.0	16.38	21.10	22.13	21.38	19. 3	22.14	7.30	22.41	7. 6	23. 0	19.45	23.31	23.51	0.14
28	2. 5	2.38	N 1.34	0.14	4.57	21.53	2.49	21. 7	6.27	21.0	16.56	21.11	22.16	21.39	18.47	22.15	7. 2	22.41	7.35	23. 1	20. 3	23.32	23.48	0.15
29	1.44	2.35			5. 4	21.50	2.35	21. 7	6.48	21.0	17.13	21.12	22.19	21.40	18.31	22.16	6.34	22.42	8. 3	23. 2	20.20	23.33	23.45	0.17
30	1.23	2.32			5.10	21.48	S 2.21	21. 6	7.10	21.1	N 17.29	21.13	22.20	21.42	18.14	22.17	N 6. 6	22.43	8.32	23. 3	S 20.36	23.35	23.40	0.18
31	S 1. 4	2.30			S 5.16	21.45			N 7.31	21.1			N 22.22	21.43	N 17.57	22.18			S 9. 0	23. 3			S 23.35	0.20

TABLE XXXII.—Joint Corrections to be always *added* to the Observed Altitude of the Sun's *lower* Limb, after it is corrected for Index Error + or — the Correction Table XXXIII., to find the *true* Altitude.——N.B. If the Altitude of the upper Limb is observed, subtract the *diameter* therefrom, and proceed as above.

Obs. Alt. ☉'s L.L.	Height of the Eye in Feet.														
	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
5. 0	3.48	3.25	3. 5	2.47	2.31	2.15	2. 1	1.48	1.36	1.23	1.10	1. 0	0.49	0.38	0.28
5.20	4.19	3.56	3.36	3.19	3. 2	2.47	2.33	2.20	2. 7	1.55	1.42	1.31	1.20	1.10	0.59
5.40	4.48	4.25	4. 6	3.49	3.31	3.17	3. 3	2.50	2.36	2.24	2.13	2. 1	1.50	1.40	1.30
6. 0	5.14	4.51	4.32	4.15	3.57	3.43	3.29	3.16	3. 3	2.51	2.38	2.27	2.16	2. 6	1.55
6.20	5.38	5.15	4.55	4.39	4.21	4. 7	3.53	3.40	3.28	3.15	3. 3	2.51	2.40	2.30	2.19
6.40	6. 0	5.37	5.18	5. 1	4.44	4.29	4.15	4. 2	3.50	3.37	3.25	3.14	3. 3	2.52	2.42
7. 0	6.20	5.57	5.38	5.21	5. 4	4.49	4.35	4.22	4.10	3.57	3.45	3.34	3.23	3.13	3. 2
7.20	6.39	6.16	5.57	5.40	5.23	5. 8	4.54	4.41	4.29	4.16	4. 4	3.54	3.43	3.33	3.22
7.40	6.56	6.34	6.15	5.58	5.40	5.26	5.12	4.59	4.47	4.34	4.22	4.11	4. 0	3.50	3.39
8. 0	7.12	6.50	6.31	6.14	5.57	5.42	5.28	5.15	5. 3	4.50	4.38	4.27	4.16	4. 6	3.55
8.20	7.27	7. 4	6.45	6.28	6.11	5.56	5.42	5.29	5.17	5. 4	4.52	4.41	4.30	4.20	4. 9
8.40	7.41	7.18	6.59	6.42	6.25	6.10	5.56	5.43	5.31	5.19	5. 6	4.55	4.44	4.34	4.24
9. 0	7.53	7.31	7.12	6.55	6.39	6.24	6.10	5.56	5.44	5.32	5.20	5. 9	4.58	4.48	4.37
9.20	8. 7	7.44	7.25	7. 8	6.52	6.37	6.23	6.10	5.58	5.46	5.33	5.22	5.11	5. 1	4.50
9.40	8.18	7.55	7.36	7.20	7. 3	6.48	6.34	6.21	6. 9	5.57	5.44	5.33	5.22	5.12	5. 2
10. 0	8.29	8. 6	7.47	7.30	7.13	6.58	6.44	6.31	6.19	6. 7	5.54	5.43	5.32	5.23	5.12
10.30	8.44	8.21	8. 2	7.45	7.29	7.13	6.59	6.46	6.34	6.22	6.10	5.58	5.47	5.37	5.27
11. 0	8.58	8.36	8.17	7.59	7.43	7.27	7.13	7. 0	6.48	6.36	6.24	6.13	6. 1	5.51	5.41
11.30	9.10	8.48	8.29	8.12	7.56	7.40	7.25	7.12	7. 0	6.50	6.36	6.25	6.14	6. 4	5.54
12. 0	9.21	8.59	8.40	8.23	8. 7	7.52	7.37	7.23	7.12	7. 1	6.47	6.36	6.25	6.15	5. 5
13. 0	9.41	9.19	9. 0	8.43	8.27	8.12	7.58	7.45	7.33	7.21	7. 9	6.58	6.47	6.36	6.26
14. 0	9.59	9.37	9.18	9. 1	8.45	8.30	8.16	8. 3	7.51	7.39	7.27	7.16	7. 5	6.54	6.44
15. 0	10.15	9.53	9.34	9.17	9. 1	8.46	8.32	8.19	8. 7	7.55	7.43	7.32	7.21	7.11	7. 1
16. 0	10.28	10. 6	9.47	9.30	9.14	8.59	8.45	8.32	8.20	8. 8	7.56	7.45	7.34	7.24	7.14
17. 0	10.40	10.18	9.59	9.42	9.26	9.11	8.57	8.44	8.32	8.20	8. 8	7.57	7.46	7.36	7.26
18. 0	10.50	10.28	10. 9	9.52	9.36	9.21	9. 7	8.54	8.42	8.30	8.18	8. 7	7.56	7.47	7.37
19. 0	11. 0	10.38	10.19	10. 2	9.46	9.31	9.17	9. 4	8.52	8.40	8.28	8.17	8. 6	7.57	7.47
20. 0	11. 9	10.47	10.28	10.11	9.55	9.40	9.26	9.13	9. 1	8.49	8.37	8.26	8.15	8. 5	7.55
21. 0	11.17	10.55	10.36	10.19	10. 3	9.48	9.34	9.21	9. 9	8.57	8.45	8.34	8.23	8.13	8. 3
22. 0	11.25	11. 3	10.44	10.27	10.11	9.56	9.42	9.29	9.17	9. 5	8.53	8.42	8.31	8.21	8.11
23. 0	11.31	11. 9	10.50	10.33	10.17	10. 2	9.48	9.35	9.23	9.11	8.59	8.48	8.37	8.27	8.17
24. 0	11.38	11.16	10.57	10.40	10.24	10. 9	9.55	9.42	9.30	9.18	9. 6	8.55	8.44	8.34	8.24
25. 0	11.44	11.22	11. 3	10.46	10.30	10.15	10. 1	9.48	9.36	9.24	9.12	9. 1	8.50	8.40	8.30
26. 0	11.49	11.27	11. 8	10.51	10.35	10.20	10. 6	9.53	9.41	9.29	9.17	9. 6	8.55	8.45	8.35
27. 0	11.54	11.32	11.13	10.56	10.40	10.25	10.11	9.58	9.46	9.34	9.22	9.11	9. 0	8.50	8.40
28. 0	11.59	11.37	11.18	11. 1	10.45	10.30	10.16	10. 3	9.51	9.39	9.27	9.16	9. 5	8.55	8.45
30. 0	12. 7	11.45	11.26	11. 9	10.53	10.38	10.24	10.11	9.59	9.47	9.35	9.24	9.13	9. 3	8.53
32. 0	12.15	11.53	11.34	11.17	11. 1	10.46	10.32	10.19	10. 7	9.55	9.43	9.32	9.21	9.11	9. 1
34. 0	12.22	12. 0	11.41	11.24	11. 8	10.53	10.39	10.26	10.14	10. 2	9.50	9.39	9.28	9.18	9. 8
36. 0	12.28	12. 6	11.47	11.30	11.14	10.59	10.45	10.32	10.20	10. 8	9.56	9.45	9.34	9.24	9.14
38. 0	12.34	12.12	11.53	11.36	11.20	11. 5	10.51	10.38	10.26	10.14	10. 2	9.51	9.40	9.30	9.20
40. 0	12.38	12.16	11.57	11.40	11.24	11. 9	10.55	10.42	10.30	10.18	10. 6	9.55	9.44	9.34	9.24
42. 0	12.42	12.20	12. 1	11.44	11.28	11.13	10.59	10.46	10.34	10.22	10.10	9.59	9.48	9.38	9.28
44. 0	12.47	12.25	12. 6	11.49	11.33	11.18	11. 4	10.51	10.39	10.27	10.15	10. 4	9.53	9.43	9.33
46. 0	12.51	12.29	12.10	11.53	11.37	11.22	11. 8	10.55	10.43	10.31	10.19	10. 8	9.57	9.47	9.37
48. 0	12.55	12.33	12.14	11.57	11.41	11.26	11.12	10.59	10.47	10.35	10.23	10.12	10. 1	9.51	9.41
50. 0	12.57	12.35	12.16	11.59	11.43	11.28	11.14	11. 1	10.49	10.37	10.25	10.14	10. 3	9.53	9.43
52. 0	13. 1	12.39	12.20	12. 3	11.47	11.32	11.18	11. 5	10.53	10.41	10.29	10.18	10. 7	9.57	9.47
54. 0	13. 4	12.42	12.23	12. 6	11.50	11.35	11.21	11. 8	10.56	10.44	10.32	10.21	10.10	10. 0	9.50
56. 0	13. 6	12.44	12.25	12. 8	11.52	11.37	11.23	11.10	10.58	10.46	10.34	10.23	10.12	10. 2	9.52
58. 0	13. 9	12.47	12.28	12.11	11.55	11.40	11.26	11.13	11. 1	10 49	10.37	10.26	10.15	10. 5	9.55
60. 0	13.10	12.48	12.29	12.12	11.56	11.41	11.27	11.14	11. 2	10.50	10.38	10.27	10.16	10. 6	9.56
62. 0	13.13	12.51	12.32	12.15	11.59	11.44	11.30	11.17	11. 5	10.53	10.41	10.30	10.19	10. 9	9.59
64. 0	13.16	12.54	12.35	12.18	12. 2	11.47	11.33	11.20	11. 8	10.56	10.44	10.33	10.22	10.12	10. 2
66. 0	13.18	12.56	12.37	12.20	12. 4	11.49	11.35	11.22	11.10	10.58	10.46	10.35	10.24	10.14	10. 4
70. 0	13.22	13. 0	12.41	12.24	12. 8	11.53	11.39	11.26	11.14	11. 2	10.50	10.39	10.28	10.18	10. 0
80. 0	13.32	13.10	12.51	12.34	12.18	12. 3	11.49	11.36	11.24	11.12	11. 0	10.49	10.38	10.28	10.18
90. 0	13.41	13.19	13. 0	12.43	12.27	12.12	11.58	11.45	11.33	11.21	11. 9	10.58	10.47	10.37	10.27

TAB.XXXIII.	Jan.		Feb.		Mar.		Apr.		May.		June.		July.		Aug.		Sept		Oct.		Nov.		Dec.	
Day.	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Corr.	+ 18″	+ 17′	+ 15″	+ 13″	+ 10″	+ 6″	+ 1″	— 3″	— 7″	— 9″	— 12″	— 14″	— 15″	— 14″	— 13″	— 11″	— 7′	— 3′	+ 1″	+ 5″	+ 9″	+ 12″	+ 16″	+ 17″

TABLE XXXIV.—Showing the Altitude of the Sun's lower limb, as indicated by Observation (with a Quadrant) when its Centre is in the Rational or True Horizon, and when the Amplitude should be observed, in finding the variation of the compass.

Ht. of Eye, Ft.	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
Alt.	17. 16	17. 37	17. 57	18. 14	18. 30	18. 45	18. 59	19. 12	19. 25	19. 37	19. 48	19. 59	20. 11	20. 21	20. 31

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☞ *The Articles and Tables preceded by the abbreviation* "App." *will be found in the Appendix; the rest will be found in the Star Tables.*

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